ELECTRICAL WEST

January 1948
25 cents

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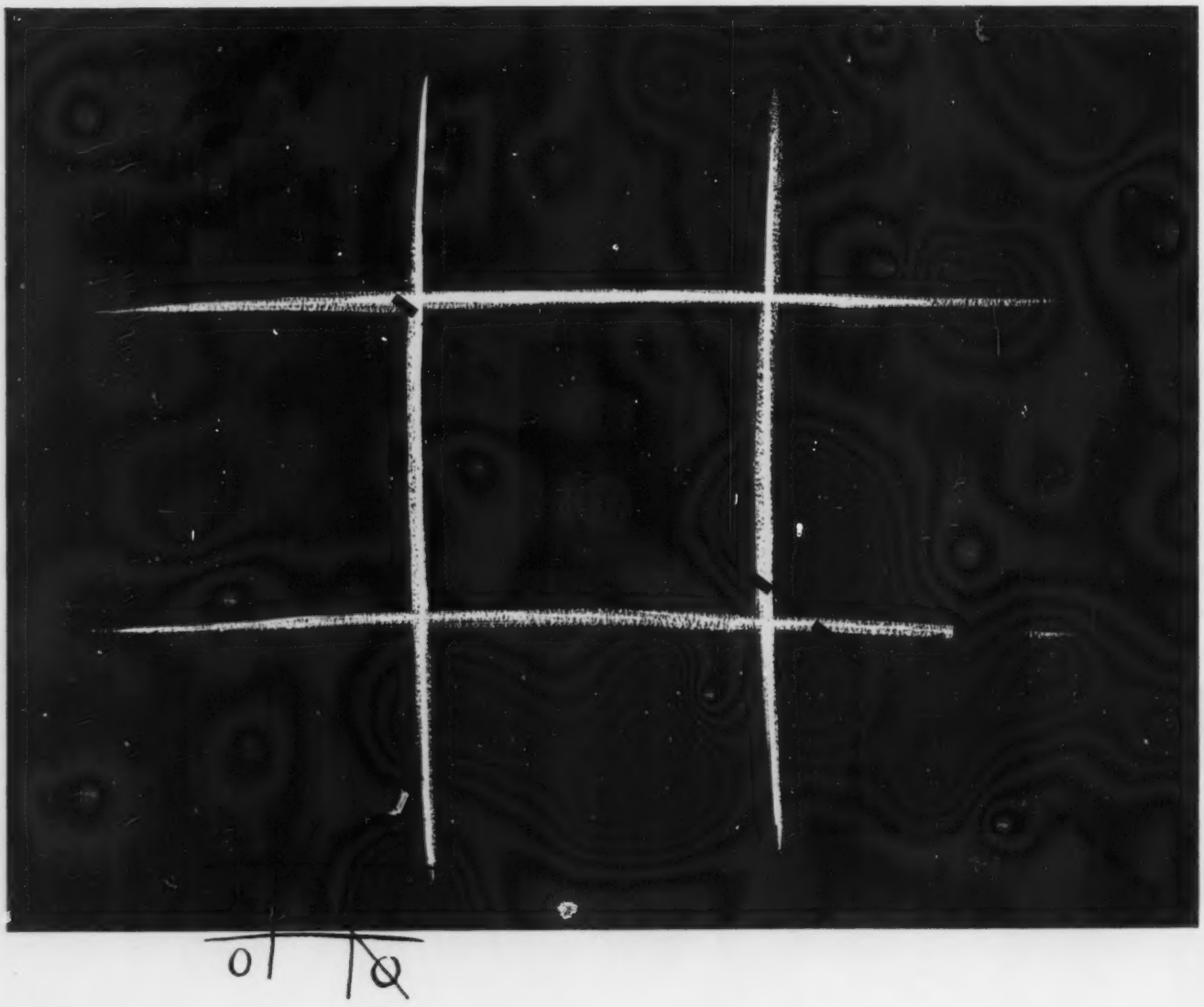
Appliances, Page 83

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.



Winning move!

Every appliance sale is the result of a three-way effort—the right touch in three places by manufacturer, utility and dealer. When each does his part in the right place, with the correct amount of force and with the proper timing, the appliance moves smoothly toward the goal of all—the home of the consumer. For more than fifty years now, Edison has kept constantly aware of the necessity for this cooperative effort. Every Edison promotion puts its entire weight into helping the dealer make the winning move!

Edison

SOUTHERN CALIFORNIA EDISON COMPANY

new data on street lighting

Replacement Glassware

AT 1¢ PER MONTH

Records, now available and covering a 10-year period, fully substantiate the claim that General Electric's spun-sealed Form 79 Luminaires have taken street-lighting glassware out of the luxury class.

New glassware *and complete reconditioning of reflectors* for Form 79 spun-sealed assemblies have averaged 1¢ per Luminaire per month. The highest reported cost by any user is under 2¢.

F. M. Spaugh, General Electric commercial engineer for street and highway lighting, examines the Form 79 Luminaire.

80% MORE LIGHT ON PAVEMENT

With the spun-sealed assembly, pressed globes or Holophane refractors are factory-sealed to the deep-shading Alzak* finished aluminum reflectors. As much as 80% more light is delivered to the pavement as with the best of older types of luminaires. Glassware is protected from chipping and dropping. Cleaning costs are reduced. Light efficiency *remains* high. In case of breakage, the complete assembly is easily replaced. You exchange damaged reflectors for reconditioned units as simply as ordering new glassware from the nearest General Electric warehouse.

SPUN-SEALED ASSEMBLIES ADAPTABLE TO OTHER LUMINAIRES

Spun-sealed assemblies can be used to modernize earlier types of luminaires, and are available for the Form 72 with its wet-process-porcelain insulator for series circuits. They are available for symmetrical, asymmetrical, and C-Sym-Etric light distribution.

**Mfg. under Aluminum Co. of America patents.*

Good Street Lighting Builds Good Will

The spun-sealed reflector-glassware assembly, as introduced with the Form 79 luminaire, is one of many developments which General Electric has pioneered to help you provide better street lighting at lower cost.

For additional information on the Form 79 luminaire, and on spun-sealed assemblies for other luminaires, call our nearest office or write to *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

452-46

Are you tying in with the NEMA plan to give America better street lighting?

JANUARY
1948

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents Copyright. Sixtieth year of publication.

ELECTRICAL WEST

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EVERY LITTLE FIGURE HAS A MEANING

Once a year, like it or not, it's good to look at the figures. For arithmetic has a way of being unavoidable. It symbolizes realities. And facts are what business is built upon, even if its aims ascend sometimes into the ideals and wishes of people, wishes which business seeks to satisfy. So a good analytical look at the facts and figures gives anyone in this industry a "reference point" from which to plot his own future course of action. In the February issue, for the 29th time, Electrical West will present some of the most important figures and facts about this industry and its aims for the new year, 1948. Those who are acute to keeping in touch with important trends as an aid will find a lot of value in the engineering and sales figures reviewed in that issue. There is useful data for the dealer, the contractor, the utility engineer and commercial man, the distributor and manufacturer, the consulting engineer, the electrical inspector and the accountant and advertising man. In fact the February issue is always one to keep throughout the year for reference as to plans, performances, intentions and markets.

In addition, there will be the News Section, Sales Guide News Letter and other features regularly carried in Electrical West.

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Cover photo: How the crowds surged around the electric appliance exhibits and demonstrations at the 10th annual show of the Bureau of Radio and Electrical Appliances of San Diego County, early in December. See the story on this spectacular show on page 91.

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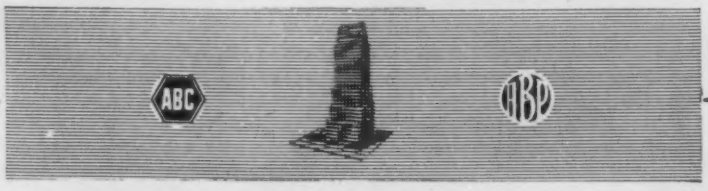

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VOL. 100
NO. 1

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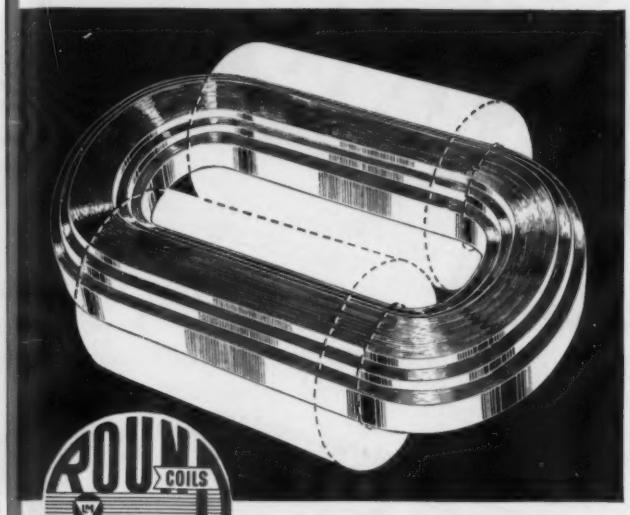
Advantages of the WOUND CORE in L-M Round-Wound Distribution Transformers



ROUND COILS LM WOUND CORE REG. U.S. PAT. OFF.

One of the factors which contributes greatly to the balanced performance of L-M Round-Wound Transformers is the *wound* core construction. Here are some of the important advantages:

- Core is wound into an ideal core shape, eliminating wasteful corner sections and providing a continuous flux path.
- Core is wound under tension, in the direction of the grain of the silicon-steel strip. This method eliminates air gaps and results in low exciting current, small dimensions, and light weight.
- Core is not cut, unwound, or disturbed in any way after annealing, which assures freedom from winding stresses, and better uniformity of losses and lower exciting current.

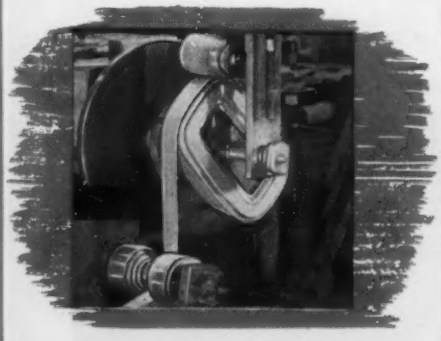
The various steps in the core-winding method are described and illustrated below.

L-M Round-Wound Transformers are available in 1½ to 50 Kva, in all distribution class voltages including 14,400 volts, and meet EEI and NEMA standards.

Write for Bulletin 16-G-1

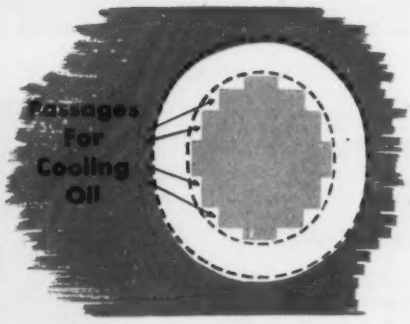
Get the complete story on L-M Round-Wound distribution transformers from this new bulletin. Gives details on construction, specifications, accessories, hangers, and tap changers. Write Line Material Company, Transformer Division, Zanesville, Ohio.

How the Core Is Wound



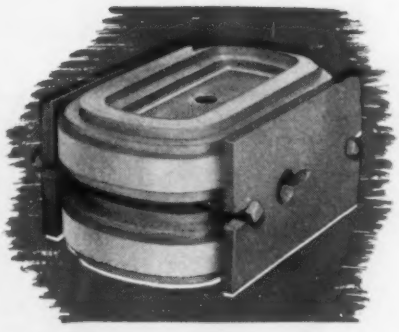
1

Successive varying widths of steel strip are joined and wound with the grain, under tension, on a form of the desired size. The wound core provides a continuous flux path with no wasteful corner sections and practically no air gaps.



2

Result is a wound core with a stepped cross section, cruciform in shape, approximating the round, permitting the winding of *round* coils. This shape, electrically ideal, provides channels between core and coil for free circulation of cooling oil.



3

After the core has been wound, it is clamped for annealing. Core is not disturbed, cut, or unwound or disassembled after annealing. This method assures stable and uniform performance characteristics; freedom from winding stresses.

LM

LINE MATERIAL TRANSFORMERS

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street and Airport Lighting Equipment • Wired Radio Control Equipment • Capacitors

INDUSTRIAL HEATING

THERE IS A G-E HEATING DEVICE FOR EVERY USE IN INDUSTRY

General Electric, with its broad experience in adapting heaters to industry, can be expected to have the answer. With Calrod units the design possibilities are unlimited in solving practically any heating problem.

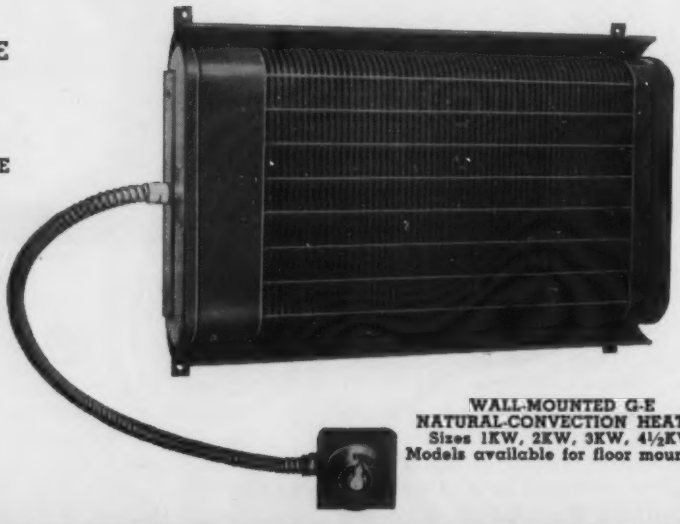
All Eleven Offices and Warehouses of the GENERAL ELECTRIC SUPPLY CORPORATION on the Pacific Coast can help you cut costs with the correct heating device for the job!

G-E PORTABLE BLOWER-TYPE ELECTRIC AIR HEATER SIZES FROM 2KW TO 15KW

G-E STRIP HEATERS FOR UNIFORM HEAT DISTRIBUTION

A NEW AND IMPROVED LINE OF G-E Calrod SOLDERING IRONS with Ironclad tips FOR INDUSTRIAL USE

UNIFORM PERFORMANCE
•
LONG LIFE AND LOW MAINTENANCE
•
CONVENIENT AND LOW COST BENEWAL
•
HIGH SPEED SOLDERING



WALL-MOUNTED G-E NATURAL-CONVECTION HEATER
Sizes 1KW, 2KW, 3KW, 4½KW
Models available for floor mounting

GENERAL ELECTRIC SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
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TRIMMING UNDERGROUND COSTS ...a job where OKOSHEATH PROTECTIVE COVERINGS help you

One of the greatest single cuts proposed in recent years is that if manhole-to-manhole distance can be more than doubled, over-all costs can be halved. How make any such phenomenal saving without changes in cable, splices, ducts and manholes? R. G. Finnerty, of Boston Edison, has explained how. There are less than half as *many* manholes for 1,000-ft pulling lengths as for 450-ft. There are less than half as *many* sections to pull. There are less than half as *many* joints to make and fireproof. Failures and maintenance would be only negligibly different. Thus annual costs probably could be halved.

This is the rough economic justification for cutting the number of manholes. The necessary parallel for the doubling of pulled-cable lengths is found in the value of friction coefficient. Without going into the details Finnerty told the New England distribution engineers, it may be said that 0.3 suffices in many cases where 0.5 has been used. The gain comes from lubrication, well-aligned ducts, careful pulling.

This "Electrical World" editorial of August 30, 1947 suggests the use of longer cable lengths as a means of reducing underground costs. This can be accomplished by lowering the coefficient of friction during the pulling-in operation.

Cost Reduction #1 — For many years, hundreds of thousands of feet of cable (up to 3,000 MCM and 138 kv) with Okosheath Protective Coverings have been playing an important role in trimming underground costs. Now, as suggested in the article, they can give further help. Utilities report reductions in pulling tensions of 25% where Okosheath Protective Coverings have been used and, in consequence, correspondingly longer lengths could readily be installed.

Cost Reduction #2 — Pulling tensions can be reduced even more by taking advantage of the reinforcing properties of Okosheath Protective Coverings and using lead sheaths of less than the AEIC thickness normally required for bare, unprotected lead coverings. Weights are thus reduced and so are cable costs (Reference: Okometal Bulletin OK-1034).

Cost Reduction #3 — The "Electrical World" article states that "failures and maintenance would be only negligibly different." This may be true of bare, unprotected cables, but, where Okosheath Protective Coverings are added, underground costs of this nature are also trimmed because:

(1) Chemical corrosion is prevented
(2) Electrical corrosion is eliminated
(3) Resistance to manhole bending fatigue is increased
(4) The sheath is protected against mechanical damage during installation
(5) The reinforcing properties reduce the effects of expansion from internal pressures
(6) Grading of duct lines for draining purposes is unnecessary.

IF YOU WANT MORE INFORMATION

The diagram above shows the construction of Okosheath Protective Covering, but full details on tests, of long and wide field experience and the answers to many questions asked by engineers are given in Bulletin OK-2046A, just issued. Just ask us for a copy. The Okonite Company, Passaic, N. J.

6148

OKONITE-CALLENDER paper insulated power cables

25 KVAR IN

The new 25 kvar capacitor (at right) can be installed as readily as the 15 kvar capacitor (at left).

Another GE First

1930—G.E. introduced thin kraft paper

1930—G.E. introduced 10 kvar, oil-filled, individual unit

1931—G.E. introduced *Pyranol

1932—G.E. introduced 15 kvar Pyranol individual unit

1937—G.E. introduced resistance-welded, drawn-steel cases

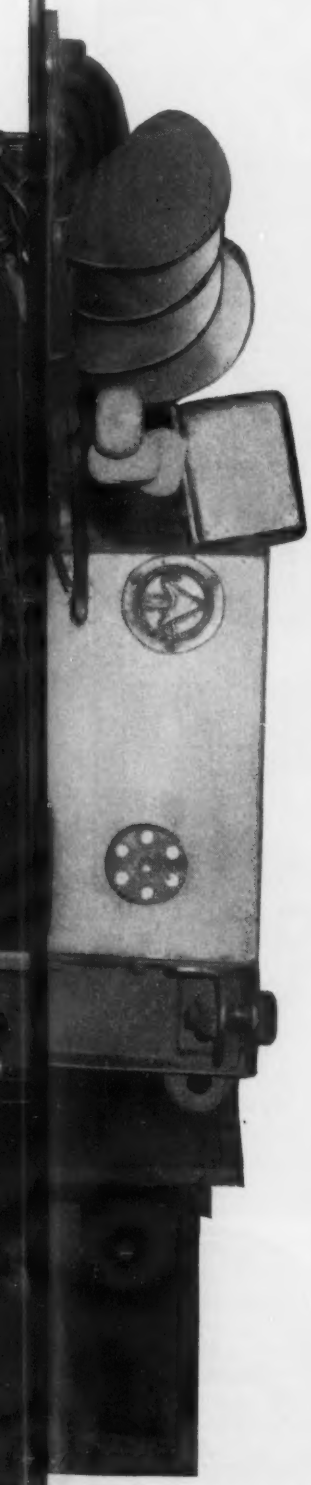
1947—G.E. introduced glass bushings

AND NOW—G.E. introduces a 25 kvar pole-type unit

ONE CAPACITOR UNIT

FOR POLE MOUNTING

General Electric announces a 25-kvar Pyranol capacitor that can be mounted in standard hangers



SMALL INCREASE IN SIZE OVER 15-KVAR UNIT These new capacitors, with 67 per cent more capacity, take approximately the same mounting space as 15-kvar units. Length remains the same. Width is increased only one inch. Height increase, including bushings, ranges from 2¼ inches to 4¾ depending on voltage.

FEWER CONNECTIONS, BUSHINGS, HANGERS PER KVAR Installation costs come down with these new capacitors, for up to 225 kvar can be mounted on a single crossarm—whereas 180 is the limit with 15-kvar units. Fewer units per kvar means fewer bushings, connections, and less exposed surface, cutting maintenance costs, too. Standard hangers (Cat. No. 13F20 for 3 units, Cat. No. 13F1 for 1) can be used.

GLASS BUSHINGS, WELDED TO CASE, MEAN MAXIMUM DEPENDABILITY The newly announced glass bushing is used in these new capacitors—assuring a strong, hermetic seal which is permanent.

SERVICE-PROVED DESIGN These Pyranol* distribution capacitors are similar in all respects, to the hundreds of thousands of 10- and 15-kvar units which have been installed on power circuits throughout the country. Cases are of drawn steel, with one resistance welded seam.

SHORT SHIPMENT SCHEDULE These new capacitors are now available. A General Electric specialist will be glad to discuss their application to your system and Bulletin GEA-2561-F-1 is available from *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

CLASS ID—INDIVIDUAL POLE-TYPE UNITS—25-KVAR

For Nominal Circuit Voltage of	Capacitor Rating	Cat. No.	Net Wt. lb.	Approx. dimensions in inches		
				Length	Width	Over-all height (Incl. bushing)
2400 delta or 4160 gr-Y or ungr-Y	2400	13F138	70	13½	$5\frac{11}{16}$	21⅛
4160 delta, gr-Y, or ungr-Y	4160	13F140	70	13½	$5\frac{11}{16}$	21⅛
4800 delta or 8320 gr-Y	4800	13F148	71	13½	$5\frac{11}{16}$	$23\frac{9}{16}$
7200 delta or 12,470 gr-Y	7200	13F147	71	13½	$5\frac{11}{16}$	$23\frac{9}{16}$
7960 delta or 13,800 gr-Y	7960	13F141	72	13½	$5\frac{11}{16}$	$23\frac{9}{16}$

**Trade-mark Reg. U.S. Pat. Off.*

GENERAL ELECTRIC

407-124

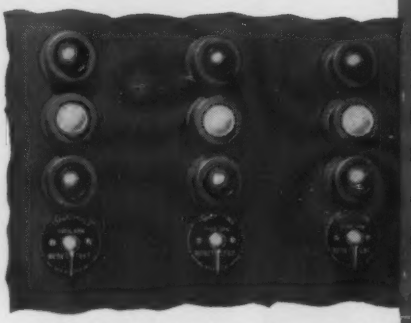
Three 3-Light *Visularms* Mounted in a Horizontal Row with Back Feed Conduit Arrangement. Rear View of Panel One Cover Removed.

The NEW *Explosion-Proof* *Visularm* CONDULETS*

safeguard continuous production
by instant warning of abnormal conditions

1. **Pilot lights** give visual indications of normal and abnormal temperature, pressure, liquid level, speed, load or other conditions.
2. **Bell or howler** can be used to give an audible signal. A single bell or howler can serve any number of *Visularms*.
3. **Flashing light** instantly directs attention to the proper control station.
4. **Reset-Test Switch.** "Reset" position silences audible signal and changes flashing light to steady until normal operation is restored. "Test" position permits periodic check of each element in the *Visularm*.
5. **Compact and easy to install.** Occupies little space on the control panel. Only requires round drilled holes.
6. **Accessible** .... all actuating devices are on a factory-wired, jack-mounted plate which can be quickly removed for servicing and a spare can be inserted to maintain operation.
7. **Flame-tight threaded joints** on all openings . . . give maximum protection with quick and easy access.
8. **Two-light and three-light** *Visularms* are available; any number can be mounted in either vertical or horizontal rows on a control panel.

Listed on new Pages 12L through 12P, Section 85, Condulet Catalog 2500.



Front View of the Panel Illustrated Above with Three 3-Light *Visularms* Mounted in a Horizontal Row.

**CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.*

A Nationwide Distribution Through Electrical Wholesalers

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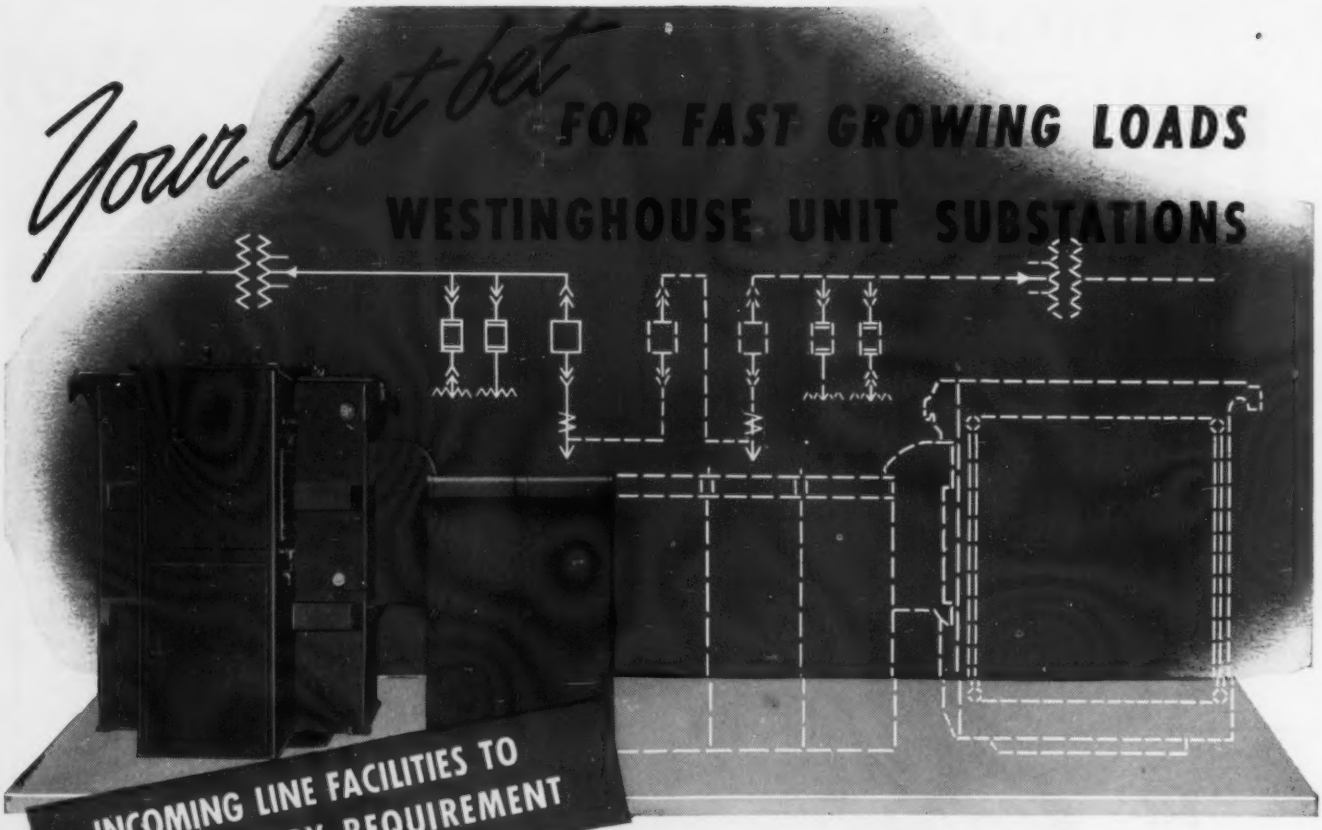
Syracuse 1, N. Y.

Offices: Birmingham – Boston – Buffalo – Chicago – Cincinnati – Cleveland – Dallas – Denver – Detroit – Houston – Indianapolis Kansas City – Los Angeles – Milwaukee – Minneapolis – New York – Philadelphia – Pittsburgh – Portland Ore – San Francisco Seattle – St Louis – Washington *Resident Representatives* Albany – Atlanta – Charlotte – New Orleans – Richmond, Va CROUSE HINDS COMPANY OF CANADA LTD *Main Office and Plant* TORONTO, ONT

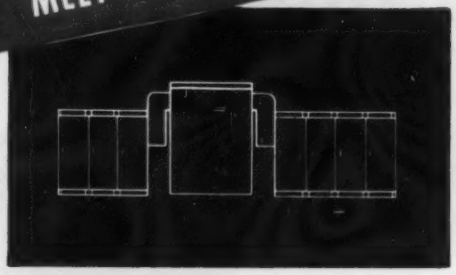
CONDULETS • TRAFFIC SIGNALS • AIRPORT LIGHTING • FLOODLIGHTS

Your best bet FOR FAST GROWING LOADS

WESTINGHOUSE UNIT SUBSTATIONS



INCOMING LINE FACILITIES TO MEET EVERY REQUIREMENT



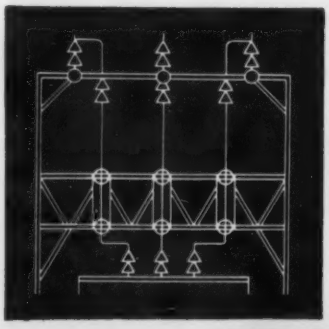
When required, Unit Substations can be supplied with co-ordinated, metal-clad, "Unitized" switchgear for incoming power supplies of 13,800 volts and below.

With rapidly changing load conditions, and the need for economical and reliable distribution . . . it will pay you to investigate the advantages of Westinghouse Unit Substations.

They not only meet today's demands, but provide *flexibility* for future changes. Increased load requirements or changes in the center of loads are easily accommodated. Co-ordinated design plus "Unitized" switchgear permits selecting unit capacities to meet existing needs, yet simplifies expansion as exemplified above. Compactness provides application flexibility—lower real estate costs—pleasing appearance—and greater accessibility. Unit Substations can be located close to the load center. When the load center shifts, they can be easily moved to the new location.

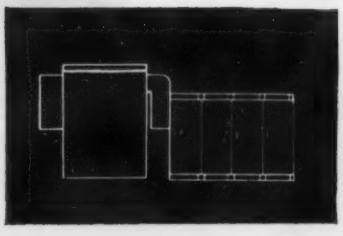
Westinghouse Unit Substations are today's answer to the fast growing loads ahead. For full information, call Westinghouse or write for B-3238, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-97125



Prefabricated, overhead, incoming line structures.

Transformer-mounted terminal chambers or switches for use with underground cables.



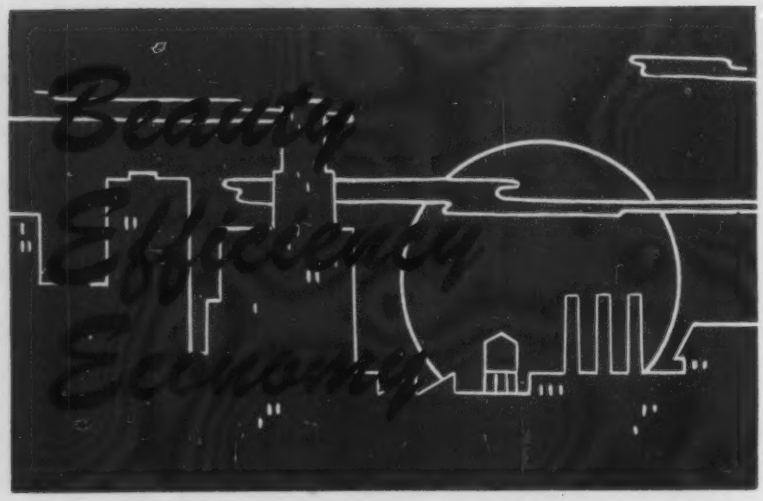
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

UNIT SUBSTATIONS FOR ANY SYSTEM

THERE'S

NEW

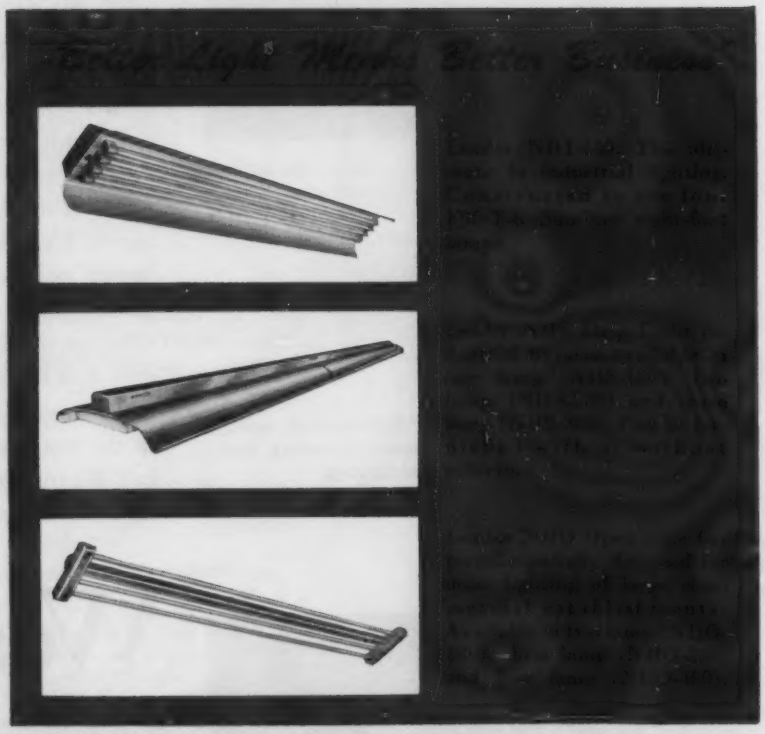


Leader NHC-480. America's newest and most beautiful commercial lighting fixture. Designed for four F96-T-8 Slimline eight-foot lamps. Constructed for ceiling or stem suspension mounting. Ideal for use as single units or continuous run installations.

in Leader NEW HORIZON Fixtures

for use with Slimline tubes

New Horizon fluorescent fixtures offer new beauty and new advantages to the architect and designer of lighting installations. Since these new units are thinner in proportion to their length, they create new opportunities for modern styling and higher lighting efficiency, with low maintenance costs and versatility of surface brightness.



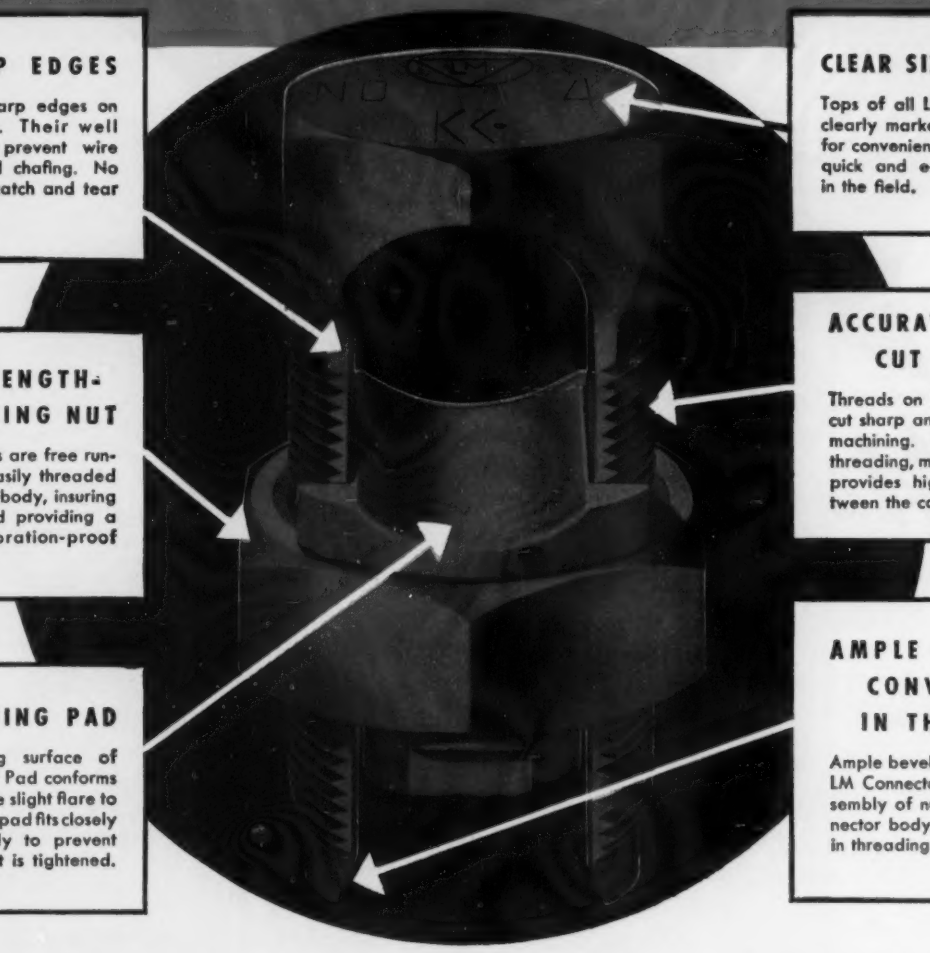
Only the best electrical wholesalers and contractors distribute and install Leader fixtures.

LEADER ELECTRIC COMPANY

3500 N. KEDZIE • CHICAGO 18, ILLINOIS

WEST COAST FACTORY • 2040 LIVINGSTON ST., OAKLAND 6, CALIFORNIA

When You Buy Electrical Connectors Insist on These LM Features



NO SHARP EDGES

There are no sharp edges on LM Connectors. Their well rounded edges prevent wire from nicking and chafing. No sharp edges to catch and tear lineman's glove.

HIGH STRENGTH-FREE RUNNING NUT

LM Connector nuts are free running. They are easily threaded full length of the body, insuring a good grip and providing a long lasting, vibration-proof connection.

CLOSE FITTING PAD

Rounded bearing surface of the LM Connector Pad conforms to wire. Ends have slight flare to avoid nicking. The pad fits closely in connector body to prevent collapse when nut is tightened.

CLEAR SIZE MARKING

Tops of all LM Connectors are clearly marked as to wire size for convenience. This makes for quick and easy indentification in the field.

ACCURATE MACHINE-CUT THREADS

Threads on LM Connectors are cut sharp and true by accurate machining. This assures easy threading, minimizes friction and provides highest pressure between the connected wires.

AMPLE BEVEL FOR CONVENIENCE IN THREADING

Ample bevel on the open end of LM Connectors allows easy assembly of nut and pad to connector body, acting as a guide in threading.

Line Material Split-Bolt Connectors Have Ample Strength—High Conductivity

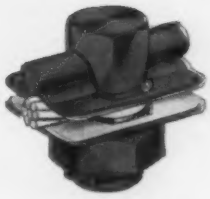
Line Material Split-Bolt Connectors, designed and manufactured by the Kyle Corporation, are available in sizes and types to take care of all connections commonly found in the field.

They are constructed of a special bronze, selected for exceptional strength and high conductivity. Yield point is considerably higher than normal use requires. This allows a more positive grip, a tighter contact.

Whether the required connection is for copper, aluminum, or steel, there is a Line Material Split-Bolt Connector to give the best possible connection.

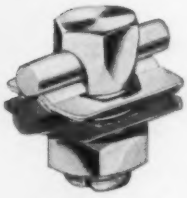
Ask your Line Material Representative for information on the full line of LM Connectors.

For Every Type of Electrical Connection Requirement



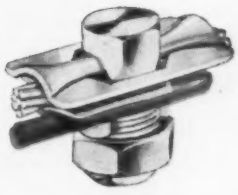
COPPER TO ALUMINUM

Bronze LM Connector with 2 bi-metal washers to accommodate wire sizes from No. 2 Solid Copper to No. 4/0 Stranded Copper; No. 4 ACSR to No. 4/0 ACSR.



STEEL OR ALUMINUM TO COPPER

Cadmium Plated Bronze LM Connector with two plated washers to accommodate wire sizes from No. 6 Solid to No. 4/0 Stranded.



ALUMINUM TO COPPER

Cadmium Plated Bronze LM Connector with 1 flared aluminum washer and 1 bi-metal washer for wire sizes from No. 2 Solid to No. 1 Solid Copper; No. 4 ACSR to No. 2 ACSR.

MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

SOLD BY... LINE MATERIAL COMPANY MILWAUKEE WISCONSIN

DON'T GO AROUND.... GO THROUGH

Many municipalities will not allow high voltage, open-wire lines to run through settled areas. To overcome this trouble many distribution engineers run their power lines around a town.

This practice is expensive — in poles, in line hardware, in right-of-way, and in wire. We suggest that you cut down this expense by installing Simplex Self-Supporting Aerial Cables. Because these cables are insulated, municipal authorities consider them safe to run through settled areas. Of course the saving in running a pole line through a settled community, instead of around it, is quite evident.

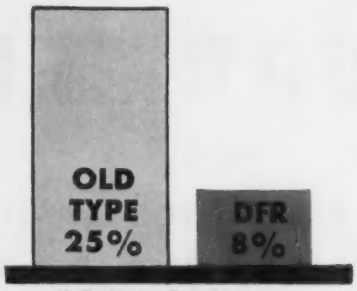
Simplex Self-Supporting Aerial Cables are made in many different constructions to meet the needs of the locality where they are to be installed. One of the most popular types is made up of one or more individually insulated and jacketed conductors bound to a properly selected messenger. Individual conductors can have the phase markings molded onto the neoprene jackets at three-foot intervals to facilitate identification for tapping.

For further information on these money-saving cables we suggest you contact the nearest Simplex representative or write direct to Cambridge.

SIMPLEX WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Boost Line Capacity...



% Excitation Requirements Based on Regulator KVA

Cut Regulator Kilovar Requirements 2/3 With DFR*—The Only Single Phase Step Regulator

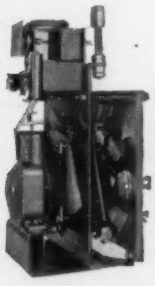
IT WAS ALWAYS GOOD economics to cut reactive kva. *Now* it's a necessity! Loads on utility systems are steadily going up. New equipment is still hard to get. So — why add to your already overburdened lines with more kilovars, when every last watt is needed? Release system capacity for pay loads!

It will pay you to use modern DFR regulators because they require only 8% excitation, compared with 25% required by old type single-phase regulators. You'll be amazed to find how much the high exciting current required by old type regulators is costing you. Figure these costs on the basis of $10 per installed kva for capacitors needed to balance high exciting current.

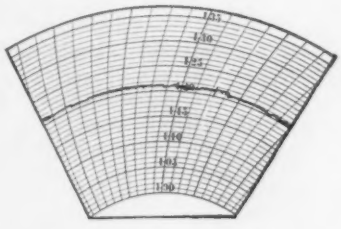
The modern Allis-Chalmers DFR regulator with its thirty-two 5/8% steps holds ± 1 volt band widths — provides the same close, reliable control successfully used to regulate over 5 million kva.

For further information on this modern economical control, call your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2339



A RUGGED, self centering, shock absorbing, quick-break mechanism is employed in the DFR regulator. Mechanism is immersed in oil — self lubricated — dirt free.



HOLDS ± 1 VOLT BAND. The DFR is unhindered by the limitations of conventional voltage relays or motor brakes to prevent overshooting or hunting.

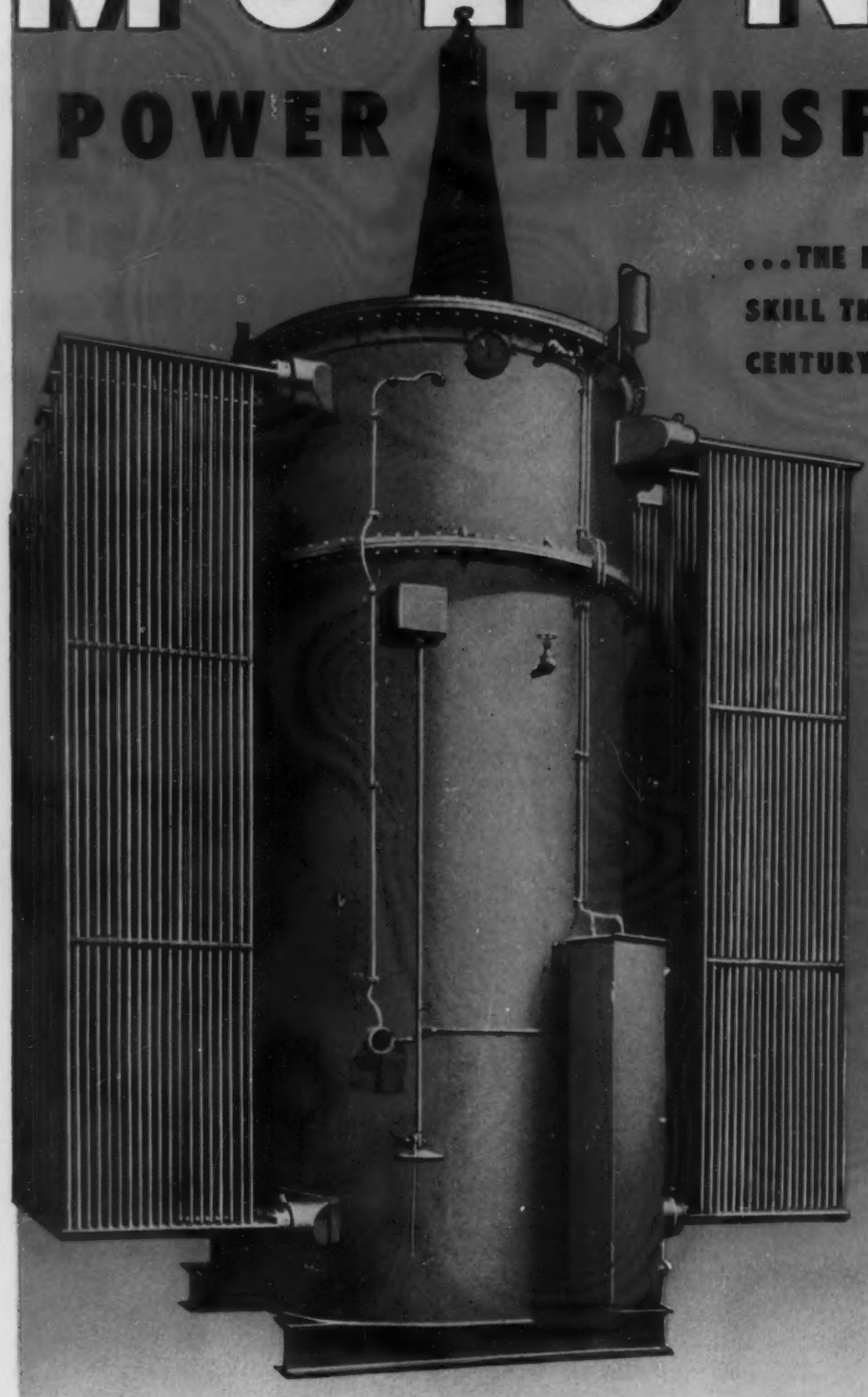
*DFR — the only station type step regulator you can buy for single phase duty. Sizes to 6900 v, 250 kva. For 3 phase regulation there is the AFR.

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

MOLONEY

POWER TRANSFORMERS



...THE PRODUCT OF MANUFACTURING SKILL THAT HAS BEEN OVER HALF A CENTURY IN THE MAKING...

When you purchase your Power Transformers from Moloney, you are buying precision equipment which has been planned, built, and *tested* to give uninterrupted service with minimum maintenance. Designing and fabricating a giant transformer requires a combination of skill and know-how... born of years of experience in the making of thousands of previous transformers. In a sense, we started building your transformers a little over fifty years ago... yet your transformers will have improvements *over any other transformers now in existence!*

MOLONEY ELECTRIC COMPANY

POWER AND DISTRIBUTION TRANSFORMERS SINCE 1896

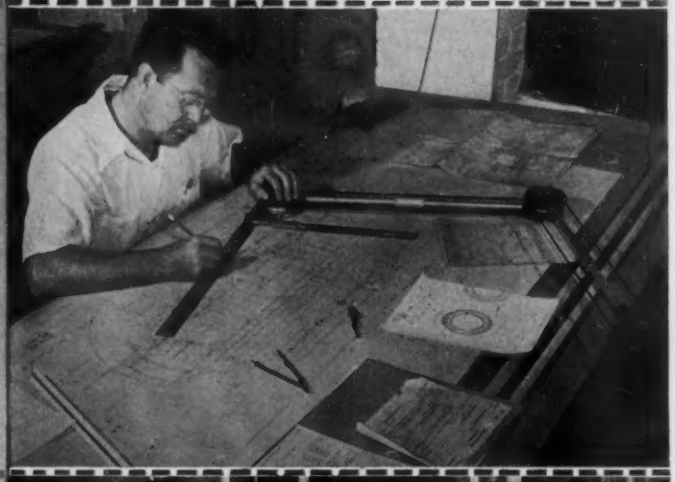
SAINT LOUIS 20, MISSOURI ☆ TORONTO, ONTARIO, CANADA

FIRST...
THE ENGINEER'S PROBLEM...

Your specifications of winding capacities and voltages must be translated into terms of cores, windings, insulation, bushings, terminal boards, tap changers... and many other items of design. Moloney engineers know the right answers. At their fingertips are the Moloney files... *fifty years in the making*... a veritable gold mine of information.

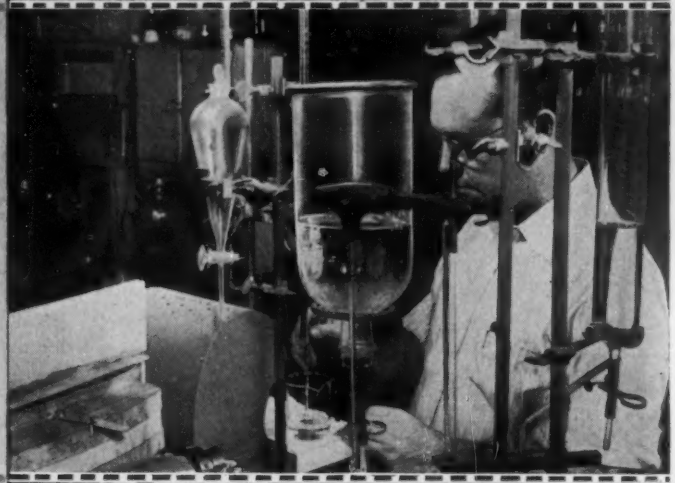
NEXT, THE DRAFTSMAN...

Taking the engineer's electrical design, the draftsman must develop the mechanical design, which includes the core clamping structure, lead supports, terminal boards and other items necessary for a complete core-and-coil assembly. In locating the various parts, he must provide adequate electrical clearance and creepage to prevent internal flashovers. Next, the tank must be designed and the size and number of cooling tubes or radiators calculated. These are but a few of the details where Moloney's experience really counts.



THE LABORATORY... TROUBLE SHOOTING BEFORE TROUBLE CAN BEGIN...

It is here that the raw materials... the steel, the copper, the oil, the insulating materials, etc., are tested to determine whether they meet Moloney specifications. Materials are checked in advance of use... in effect, trouble shooting before trouble can begin. Here in the Moloney Laboratories experienced engineers and technicians, using modern equipment and new techniques, pre-test raw materials in order to insure the trouble-free, uninterrupted operation you expect from your Moloney Transformers.



ENGINEERING DEPARTMENT...

Moloney's highly trained engineers are skilled in every phase of transformer theory and practical application. The "blueprinting" of a Moloney Transformer is no one-man job... it is a job that utilizes the combined know-how of many specialists, each an expert in his field of transformer design. Moloney's large staff of experienced engineers can design transformers to meet *your* particular requirements... and which will provide many years of reliable service.

ON LINE CONSTRUCTION AND MAINTENANCE

FWD TRUCKS DO MORE WORK

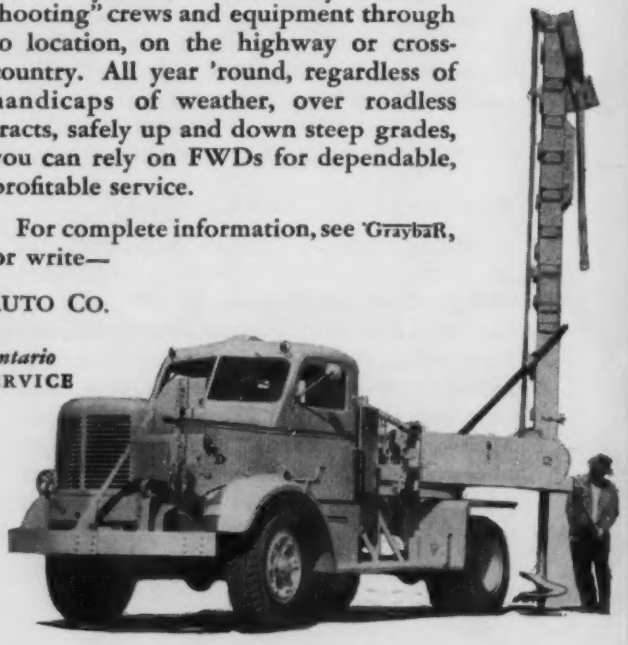
FWD four-wheel-drive utility trucks are more than mere trucks. They are highly specialized mobile "workshops" essential to line construction and maintenance. From bumper to bumper, they are utility-engineered "tools" for utilities.

The ruggedness and "going power" of FWD four-wheel-drive *power and traction on all wheels* have won for FWDs their reputation as "the trucks that *do not fail* the power lines that *must not fail.*"

Even when winter throws its snow blockades across field and highway, with ice and snow working havoc on communication systems, FWDs carry "trouble-shooting" crews and equipment through to location, on the highway or cross-country. All year 'round, regardless of handicaps of weather, over roadless tracts, safely up and down steep grades, you can rely on FWDs for dependable, profitable service.

For complete information, see GraybaR, or write—

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ontario
WORLD-WIDE SALES and SERVICE



GraybaR Distributed by GraybaR

America's Foremost Heavy-Duty Truck

THUMBS DOWN ON VARNISH FAILURES

Don't depend on guess work in the selection of Insulating Varnishes. Choose the exact type for each requirement from the specialized materials which comprise the Pedigree line. Higher dielectric strength . . . Maximum mechanical, thermal and chemical protection . . . uniform quality . . . all these add up to better performance.

Pedigree Varnishes

Get your copy of the Pedigree Varnish Catalog today. Just write . . . no charge.

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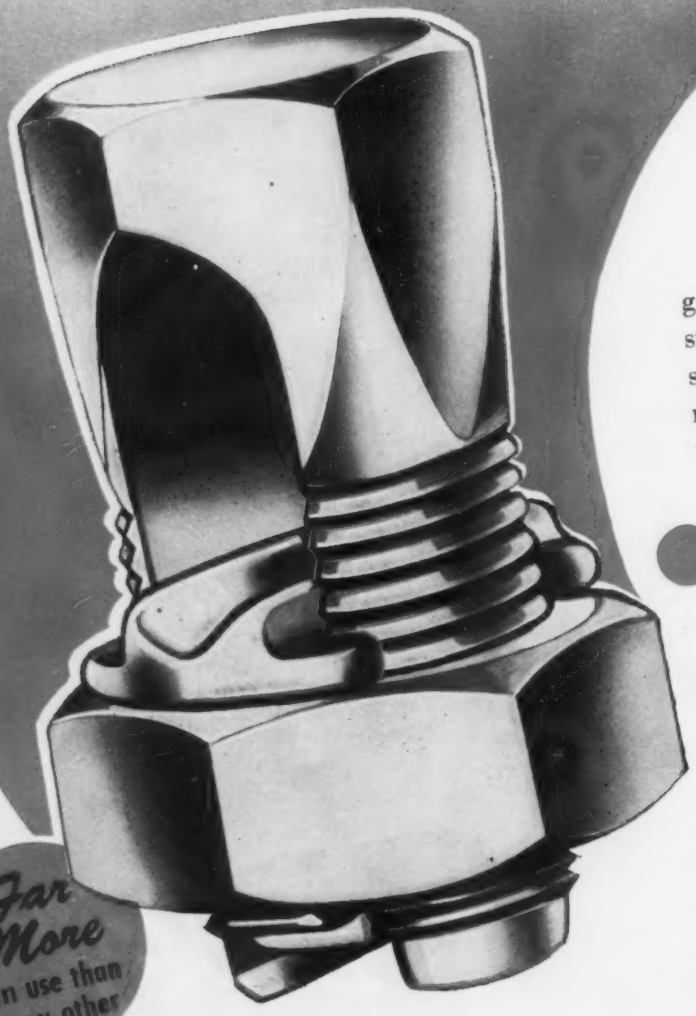
INSULATION AND WIRES INCORPORATED

TRI-STATE SUPPLY CORPORATION

Manufactured by

THE P. D. GEORGE COMPANY, ST. LOUIS, U. S. A.

PENN-UNION *means* STRENGTH *and* PRECISION



Accurately made, with rigid engineering inspection. The clean smooth threads assure maximum pressure on the conductors—permanently maintained. Not distorted by use . . . re-usable over and over.

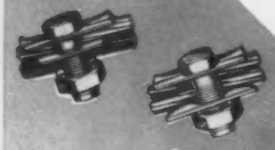
BETTER DESIGN

with larger gripping surfaces for the wrenches, from any angle — using either a socket or open-end wrench . . . *more practical to use.* Bevelled slot protects the conductors. . . . V-groove assures maximum contact.

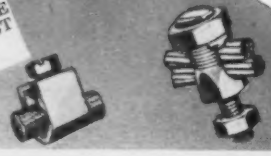
Developed by 20 years of constant improvement. Penn-Union also makes a complete line of Tees, Straight and Angle Connectors, Terminals, Grounding Clamps, Bus Supports, etc., etc.

Far More in use than any other

FULL LINE OF ALUMINUM CONNECTORS



SERVICE ENTRANCE AND SERVICE POST CONNECTORS



PENN-UNION ELECTRIC CORPORATION, ERIE, PA.

Kenneth Anderson Co.
412 Seaton St.
Los Angeles

Northwestern Agencies
4130 First Ave. South
Seattle, Washington

F. M. Nicholas Co.
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WITH OR WITHOUT RETAINER

The COMPLETE Line of Conductor Fittings

PENN-UNION

Magnet Wire News

TRI-STATE SUPPLY CORPORATION

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WEST COAST DISTRIBUTORS

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ANACONDA MAGNET WIRE

TO SERVE

Western Mine and Industrial Maintenance Departments and Motor Repair Shops

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Tri-State Supply Corporation—dependable source of supply for everything in electrical insulation—maintains three complete warehouse stocks located at:

LOS ANGELES	SAN FRANCISCO	SEATTLE
544 S. San Pedro Street Los Angeles 13, Calif.	554 Bryant Street San Francisco 7, Calif.	318 Occidental Ave. Seattle 4, Wash.

A partial list of Tri-State stock items: bronze bearings and bars, cotton tapes and sleevings, magnet wire, lead wires and copper products, insulating varnishes and sealers, roller and ball bearings, shop equipment and tools, commutators and commutator assemblies, varnished cambric cloth and tapes, carbon brushes and resistors, Fiberglas tape, sleeving and cordage, vulcanized and phenol fibre sheets and tubes. 48445

Look to Anaconda for the newest developments in Magnet Wire

Magnet Wire Mills and laboratories at:
Orange, California; Sycamore, Illinois;
Anderson, Indiana; Muskegon, Michigan.
District Offices in principal cities.

Until the new Anaconda Magnet Wire Publication is available, send for Data Sheets 3C-2.

ANACONDA
from mine to consumer

Anaconda Wire and Cable Co.

25 BROADWAY, NEW YORK 4, N. Y.

Get PERFORMANCE *plus* PROTECTION-- *with* Wagner RURAL-LINE TRANSFORMERS

TYPE HEF-5

Select the type that meets your requirements from Wagner's COMPLETE line . . .

When you install pole-type transformers on your rural line, you naturally want to be sure they will provide dependable, efficient service. You also want them to be protected as fully as possible against damage by lightning, surges, and overloads, in such a manner that a transformer can be put back in service quickly and easily if an outage occurs.

Wagner rural-line transformers are establishing enviable records in the field, upholding the Wagner reputation for dependability earned during our half-century of designing and manufacturing distribution and power transformers. The Wagner line is complete, and offers a selection of types with protective features to meet your specific needs.

Protective Features of the Wagner Type HEF-5 Rural-Line Transformer

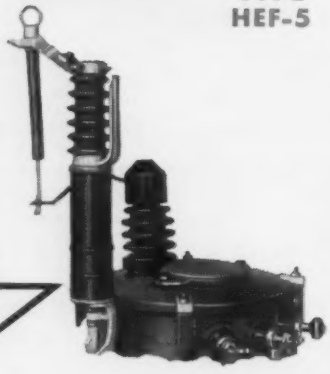
TYPE HEF-5. Double "bird-proof" gap provides surge protection; internal fuse forms a protective link between the transformer and the high voltage line. When the double gap and internal fuse are combined no other surge protection or transformer fuses are required.

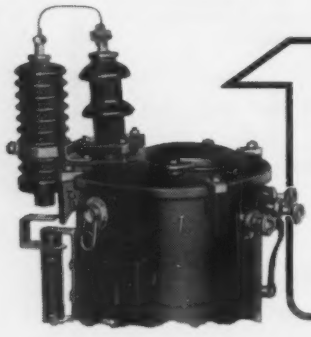
Wagner rural-line transformers are also available in the conventional type HEF, to which specified protective devices can be added. All types meet REA requirements. In addition, Wagner manufactures a complete line of substation transformers for rural-line distribution service.

Your investment in Wagner transformers is protected, too, by Wagner's nationwide organization for providing fast, convenient service. Wagner's 29 branches, located in principal cities, are ready to help you with your transformer problems.

For further information on Wagner Rural-Line Transformers, write for Bulletin TU-1C. Wagner Electric Corporation, 6381 Plymouth Avenue, St. Louis 14, Missouri.

TYPE HEF-7
Joslyn Lightning Arrester provides surge protection; primary fuse provides protection against overloads. A blown fuse can be replaced without removing the tank cover or bushing, which reduces the time required for putting the transformer back in service.

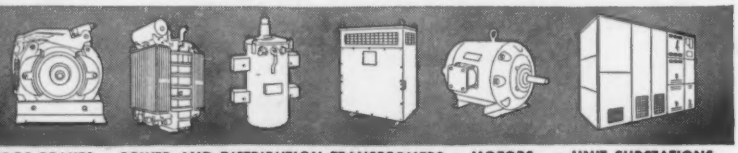




TYPE HEF-3
De-Ion Gap on high-voltage side provides surge protection; secondary circuit-breaker protects transformer against secondary short-circuits and overloads. Breaker reset handle is easily accessible; on sizes 5-kva and above, a warning signal light is built into the reset handle.

Consult Wagner Engineers on All Transformer Problems

Wagner Electric Corporation EST. 1891

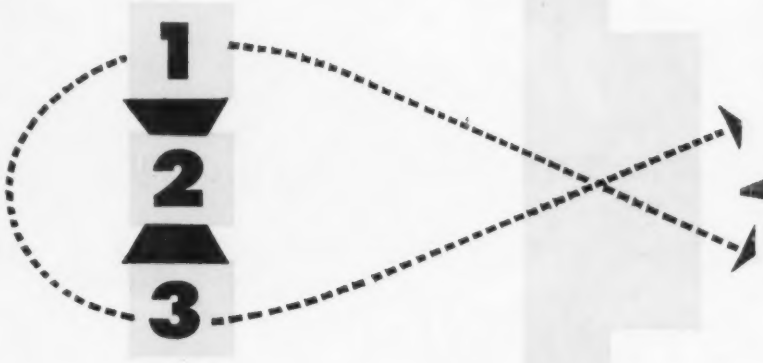


BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL AND AUTOMOTIVE PRODUCTS

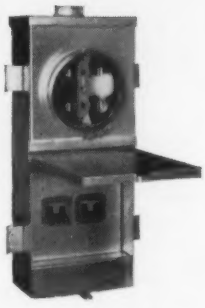
T47-3

1. SAFETY
2. ADEQUACY
3. FLEXIBILITY



RO 92 Service Entrance Device
Provision for two meters.

SQUARE D PROVIDES ALL THREE.....FOR THE HOME WITH A FUTURE!



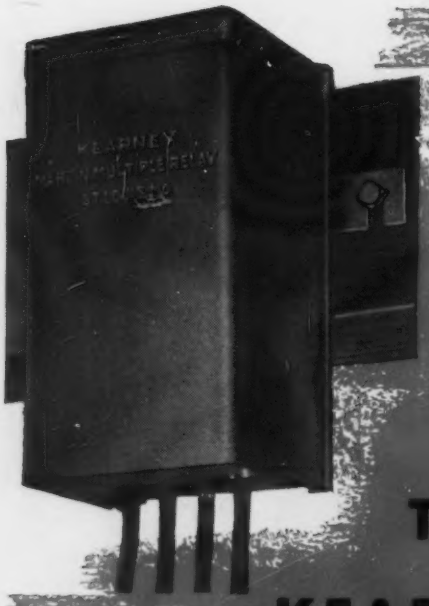
RO 20 Service Entrance Device
Provision for one meter.

One compact unit provides safe electrical control; adequate distribution of electrical load; and flexibility of circuit arrangement. The non-tamperable Multi-Breaker unit eliminates fuse replacement and offers complete control of all appliances in one unit. The unit provides for 37 different circuit arrangements. The raintight enclosure housing the Multi-Breaker and meter space can be mounted surface or semi-flush.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

SQUARE D CANADA, LTD., TORONTO, ONTARIO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.



Accessibility OF PARTS

Means Simple, Easy, Time Saving Maintenance of KEARNEY-MARTIN MULTIPLE RELAYS

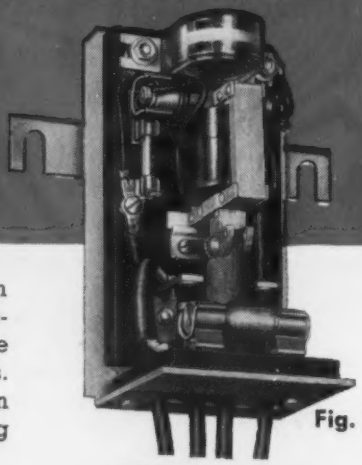


Fig. 1

FOR control of outdoor multiple lighting circuits, the Kearney-Martin relay offers years of positive operation with a minimum of maintenance. The Kearney-Martin relay is equipped with long-life, 30 ampere silver contacts and can be supplied in normally closed or open types. Protective accessories include a 3 ampere fuse in the coil circuit, an optional 30 ampere fuse in the load circuit, and an optional lightning arrester to by-pass surges around the coil and fuse.

However, when service is needed, this relay is very simple to repair. Remove the cover, and all parts are readily accessible for inspection. (See Figure 1).

Figure 2 shows how easily the operating assembly can be removed from the front of the assembly without tools.

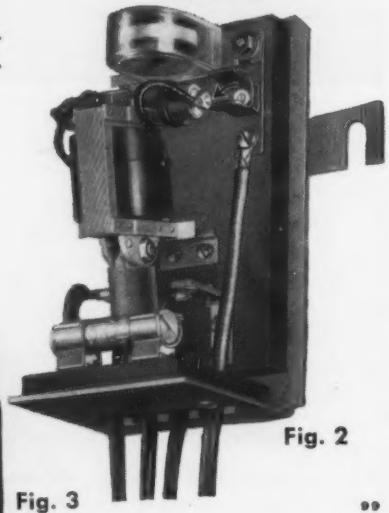


Fig. 2

Now look at Figure 3. Without removing a single screw from the relay mounting, the coil is quickly replaceable from the front of the assembly. Simply remove the coil retainer and the coil readily slips out of the frame.

Fig. 3

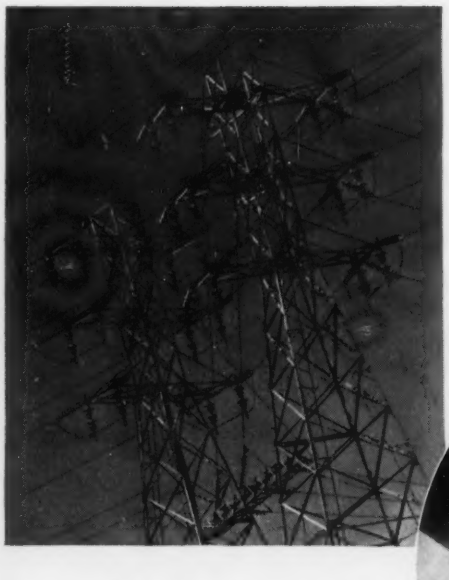
Ease of replacing parts of the Kearney-Martin relay eliminates the necessity of carrying entire relays on service trucks and reduces "pole-top" repair operations.

For Better Results

Specify Kearney Products

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE

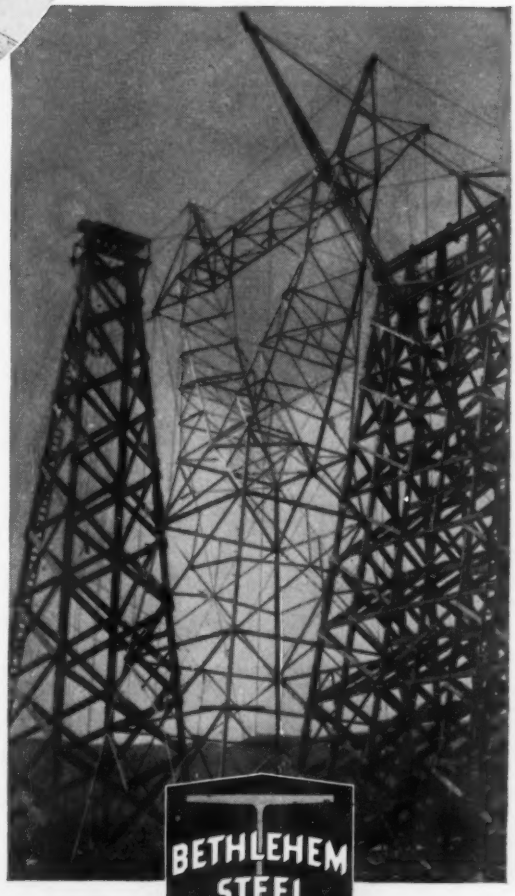
TRANSMISSION TOWERS



Designed

Fabricated

Tested



The production of steel structures for power transmission is a particularly important part of Bethlehem Pacific's business.

(1) This company is prepared to design the structural steel frames for towers, switching and bus structures to meet the customer's requirements.

(2) We maintain special facilities for applying design loads to full-size transmission towers for the purpose of checking design calculations.

(3) We operate three complete steel-fabricating shops: at South San Francisco, Alameda, and Los Angeles.

In addition, Bethlehem Pacific has steel-making plants in South San Francisco, Los Angeles and Seattle, to supply the structural shapes used for tower fabrication. With these complete and coordinated facilities Bethlehem Pacific is a dependable and economical source of fabricated steel for the entire western power industry.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM PACIFIC

BETHLEHEM STEEL

YOU WANT IT? *Electro* HAS IT!

You'll need NO other source in '48 for ALL your Fluorescent needs!

LOOK TO *Electro* FOR EVERYTHING NEW IN FLUORESCENT

- ★ Slim line
- ★ Troffers
- ★ New shallow type louvers
- ★ New streamlined industrials
- ★ Residential
- ★ Portable
- ★ Desk lamps
- ★ Bed lamps

☛ ELECTRO'S LIGHTING ENGINEERS ARE ALWAYS AT YOUR SERVICE

BE "BASIC" IN '48 — Meet all your commercial fixture requirements with one-half the inventory — Stock Electro's Basic Unit.

ELECTRO MANUFACTURING CORPORATION

2000 W. Fulton St. • Chicago 12

PLAS-TEX

PRESENTS

America's Finest Line of WIRING DEVICES

From the ultra modern plant of The Plas-Tex Corporation, comes a new conception of quality in electrical wiring devices. More than a year of research, study and experiment, is back of these precision-made devices. Made of finest materials, durably constructed, these new Plas-Tex Products will reflect credit upon the electrical contractor who uses them, upon the architect who specifies them... and upon the dealer who sells them.

DUPLEX FLUSH RECEPTACLE. Sturdily constructed, heavy molded plastic case; T slots; positive double wiping contacts of heavy bronze. 10 Amps 250 Volts; 15 Amps 125 Volts. Catalog No. PT-60 Brown; PT-60-I Ivory.
WALL PLATES. Attractively designed. Single and Two Gang Toggle Plates of sturdy heavy molded thermosetting plastic. Single—Catalog No. PT-91 Brown; PT-91-I Ivory. Two Gang—Catalog No. PT-95 Brown, PT-95-I Ivory.
WALL PLATES. Duplex Receptacle Plate, attractive design, made of durable molded thermosetting plastic. Catalog No. PT-90 Brown; PT-90-I Ivory.
OUTLET BOX RECEPTACLES. Hexagon receptacle of attractive design, made of Ivory Molded Plaskon, with shade holder groove. 660 Watts, 250 Volts. Catalog No. PT-70.
FLUSH TOGGLE SWITCHES. Quality throughout. Dustproof, molded plastic housing. Smooth, quiet action, 5 Amps 250 Volts, 10 Amps 125 Volts. Catalog No. PT-50 Brown; PT-50-I Ivory.
Sold through Electrical Wholesalers
The PLAS-TEX CORPORATION

THE Plas-Tex CORPORATION

2525 MILITARY AVENUE, POSTOFFICE BOX F
LOS ANGELES 25, CALIFORNIA

FORGED COPPER
HOT LINE CLAMP

THE new Reliable hot line clamp is cold forged of pure copper. This means a fine, tough-grained structure of uniform strength. As a result of this method of manufacture you get uniformly high strength with less weight than before. The eye screw is Everdur and cannot be distorted in installation. The standard thread will not vibrate loose, and helps an installer to feel when the clamp is tight. A lug at the base fits all clamp sticks. This clamp is for line wire sizes #1 strand to #6 solid. A split bolt connector makes the tap connection. The clamp is supplied as standard with Reliable #4F connector, which accommodates 2 #4 conductors so leads may be run to both transformer and lightning arrester. For larger taps a larger split bolt connector may be installed up to the #1F size, which accommodates a pair of #1 solid or #2 strand wires or a single tap of #1 strand size.

FORGED COPPER CLAMP
WIRE SIZE

CATALOG NO.	LINE SIDE Max.	LINE SIDE Min.	TAP SIDE Max.	TAP SIDE Min.
328C	1 Str.	6 Sol.	4 Sol.	6 Sol.

PLATED CLAMPS
For Galvanized Steel, ACSR, or Copper Wires

These clamps are electro-tinned, with the exception of the Everdur eye screw.

WIRE SIZE

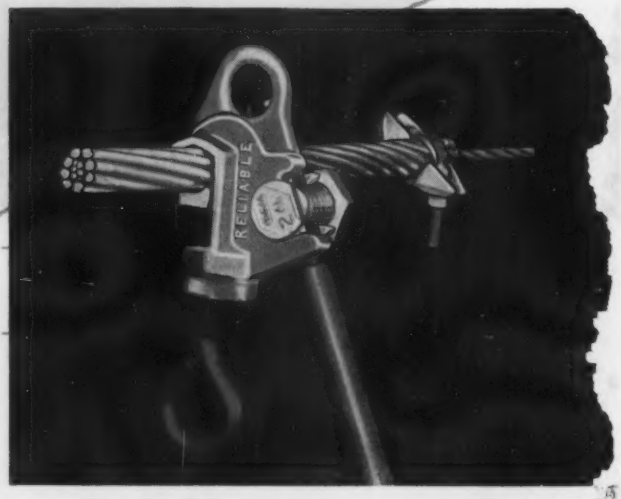
CATALOG NO.		LINE SIDE Max.	LINE SIDE Min.	TAP SIDE Max.	TAP SIDE Min.
328CP	Forged	2 ACSR 1 Str. Cu. 4 Str. Steel	8 ACSR 6 Sol. Cu. 8 Str. Steel	6 ACSR 4 Sol. Cu. 6 Str. Steel	8 ACSR 6 Sol. Cu. 8 Str. Steel
596CP	Cast Bronze	2 ACSR Over armor 4/0 Str. Cu.	8 ACSR 6 Sol. Cu.	6 ACSR 4 Sol. Cu. 6 Str. Steel	8 ACSR 6 Sol. Cu. 8 Str. Steel

CAST ALUMINUM HEAT TREATED CLAMPS
For ACSR Over Armor Rods or Steel Wires—Copper Tap

The copper tap wire is separated from the aluminum clamp body by a thick bi-metallic aluminum-copper washer, minimizing corrosion

WIRE SIZE

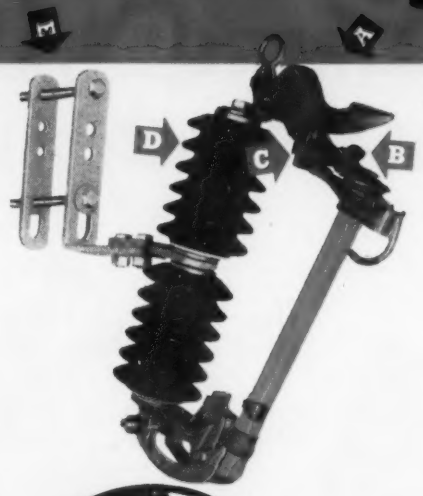
CATALOG NO.	LINE SIDE Max.	LINE SIDE Min.	TAP SIDE Max.	TAP SIDE Min.
596AC	2 ACSR Over Armor	8 ACSR	1 Str. Cu.	6 Sol. Cu.
For ACSR Over Armor Rods or Steel Wires—ACSR or Steel Taps				
596A	2 ACSR Over Armor	8 ACSR	2 ACSR 4 Str. Steel	8 ACSR 8 Str. Steel

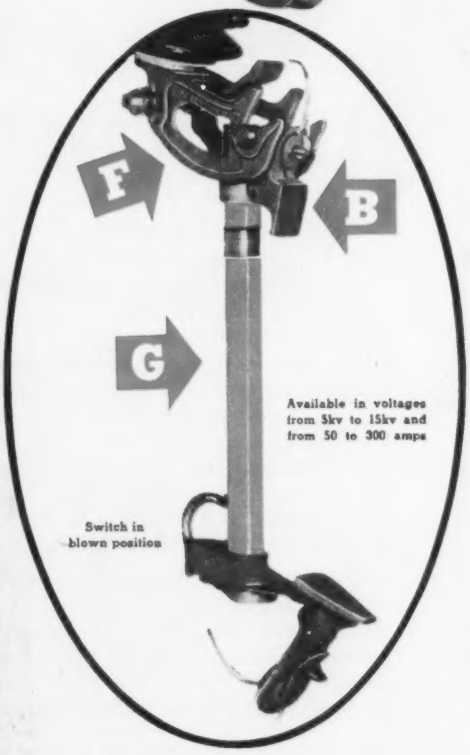


• Three point contact to line wire. Ring for assistance in holding. Control lug, for engaging with standard clamp stick.

Reliable
ELECTRIC COMPANY
3145 CARROLL AVENUE CHICAGO 12
OVER 40 YEARS *Service* TO THE UTILITIES

DEPENDABLE PROTECTION WITH





Type 33 Dropout CUTOUTS

A Sleet-shield top latch provides dependable operation under all weather conditions.

B Positive dropout action is assured by knee-action mechanism at top and bottom of tube assembly.

C Dependable operation at full rated current is assured by evenly distributed pressure and full wiping action of solid copper contacts.

D Insulator replacement costs are lower with Southern States two-piece insulator units.

E Universal mounting bracket provides either cross-arm or pole mounting.

F Self-locking hinge prevents tube falling out on down swing.

G Positive semaphore! Completely open position provides unmistakable indication of blown fuse. Tube quickly and easily removed and replacement installed with hook stick.

WRITE FOR BULLETINS ON THE ENTIRE LINE

Southern States Equipment Corp.

HOME OFFICE AND FACTORY — HAMPTON, GEORGIA

REPRESENTATIVES IN FOLLOWING CITIES:

BIRMINGHAM, ALABAMA
LOS ANGELES, CALIFORNIA
SAN FRANCISCO, CALIFORNIA
DENVER, COLORADO
WASHINGTON, D. C.
JACKSONVILLE, FLORIDA
MIAMI, FLORIDA
ATLANTA, GEORGIA
EVANSVILLE, INDIANA
VALPARAISO, INDIANA
LOUISVILLE, KENTUCKY
NEW ORLEANS, LOUISIANA
SHREVEPORT, LOUISIANA
BOSTON, MASSACHUSETTS
JACKSON, MICHIGAN
KANSAS CITY, MISSOURI
ST. LOUIS, MISSOURI
NEW YORK, NEW YORK
CHARLOTTE, NORTH CAROLINA
PHILADELPHIA PENNSYLVANIA
CHARLESTON, SOUTH CAROLINA
KNOXVILLE, TENNESSEE
MEMPHIS, TENNESSEE
DALLAS, TEXAS
HOUSTON, TEXAS
LUBBOCK, TEXAS
SALT LAKE CITY, UTAH
SEATTLE, WASHINGTON
MILWAUKEE, WISCONSIN

Reproduced from poor material

HERE'S WHAT'S Improved ABOUT ALLIS-CHALMERS DISTRIBUTION TRANSFORMERS!

They're easier to handle and install... look better, because of size and weight reduction

YES, THE PRINCIPAL changes in Allis-Chalmers distribution transformer line are: 1) a reduction in weight of 17% to 39%, and —2) a material reduction in dimensions, especially in the smaller ratings (as shown in this comparative photograph). These savings result from use of new orientated electrical core steel, thereby permitting a smaller, more compact unit without any sacrifice in operating characteristics or mechanical ruggedness.

Compare these *improved* distribution transformers with our former types. You'll find the *same* strong welded construction... corrosion resistant finish . . . careful workmanship . . . and all the other features that mean long service without attention.

SEND FOR NEW BULLETIN. For the latest dimensions, weights and construction details of these *improved* distribution transformers—from 1½ to 100 kva, 2400 through 15,000 volts — ask your nearby A-C representative for the new 12 page bulletin 61B6159B, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2371

STANDARDIZED DESIGNS

Built to meet EEI-NEMA Standards (*Preferred types)

kva	4800 volts and below	7200 volts and up
1½-25	*PBSR	*CBSR or PBSR
37½-100	*PBS	*CBS

KEY TO TYPE DESIGNATION

PBSR—High voltage pocket bushings with low voltage stud bushings in tank wall . . . round tank.

PBS—High voltage pocket bushing with low voltage bushings in tank wall . . . semi-elliptical tank.

CBSR—High voltage cover bushings with low voltage stud bushings in tank wall . . . round tank.

CBS — High voltage cover bushings with low voltage stud bushings in tank wall . . . semi-elliptical tank.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

Everything FOR MOTOR REPAIR and REBUILDING

INSULATION AND WIRES

INCORPORATED

LOS ANGELES
2043 Sacramento St.
TUcker 9201

SAN FRANCISCO
6 Moss St.
UNderhill 1-5661

- Magnet Wire
- Motor Lead Wire
- Bearings
- Varnished Cambric Products
- Insulating Paper
- Varnished Tubing
- Saturated Sleeving
- Insulating Varnish
- Fibre
- Bakelite
- Fibre Wedges
- Wood Wedges
- Built-up Mica Products
- Asbestos Insulation
- Woven Glass Insulation
- Pressure Sensitive Tape
- Cotton Tape
- Cotton Sleeving
- Commutators
- Carbon Brushes

IWI is your one single convenient, dependable source for ***all*** the materials, tools and equipment you need—in stock, ready for ***immediate delivery!*** Now you can send ***one order***—get what you want in ***one*** shipment!

At IWI every line of products is complete—nationally known and advertised—proven in service by thousands of shops and leading electrical manufacturers. Whatever you require for faster, better service, IWI gives you top quality.

Experienced IWI Field Service Representatives who talk your language are ready to serve you and help you without obligation.

Call IWI for SERVICE . . . Depend on IWI QUALITY

FREE CATALOG

The IWI Blue Catalog lists hundreds of all the items you need every day, clearly listed, clearly priced. Every shop needs it. Write Los Angeles or San Francisco for your copy today!

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HOUSTON
NEW YORK
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INSULATION AND WIRES IWI SERVICE

for safety, durability and **LONG LIFE . .**

USE ILLINOIS ALL PORCELAIN WIRING SYSTEMS

Play safe with Illinois. Its top quality is assured by rigid production control standards faithfully maintained by craftsmen with long years of training and experience. From the exacting task of selecting materials, through all steps leading to the finished product, constant inspection and extreme care combine to bring you the best in porcelain wiring systems.

LOOK FOR THE NAME

ILLINOIS

BEFORE YOU BUY!

PORCELAIN WIREHOLDER INSULATORS

Illinois dry process wireholders are uniformly made to highest specifications in sufficient styles and sizes to meet all requirements. Smooth, rounded surfaces protect wire insulation. Deep, sharp screw threads assure easy and firm installation. Non-shrinking metal alloy permanently binds screws to insulators. All-steel screws are protected with smooth, even coating by special galvanizing process. No rust streaks on sides of buildings. Wet process porcelain supplied on special order.

ALL PORCELAIN ILLINOIS SYSTEMS

For outstanding, adequate and modern wiring jobs, for every building wiring plan, use reliable, economical Illinois systems. From the entrance switch to the last outlet, porcelain systems are easily and quickly installed, insuring permanency and the utmost safety. Especially recommended where moisture or extreme temperatures are factors. Rust and corrosion resistant.

STANDARD TUBES

Glazed, unglazed, split, floor, split floor, headless, curved, crossover split, and crossover. Uniform inside and outside diameters. Sizes ½ to 48" long, 5/16 to 3" diameter.

Bull Dog

Firm grip knobs that don't chip when installed. Cement coated, extra length nail — genuine leather washer — code standard. Wide variety of heights, diameters, holes and grooves.

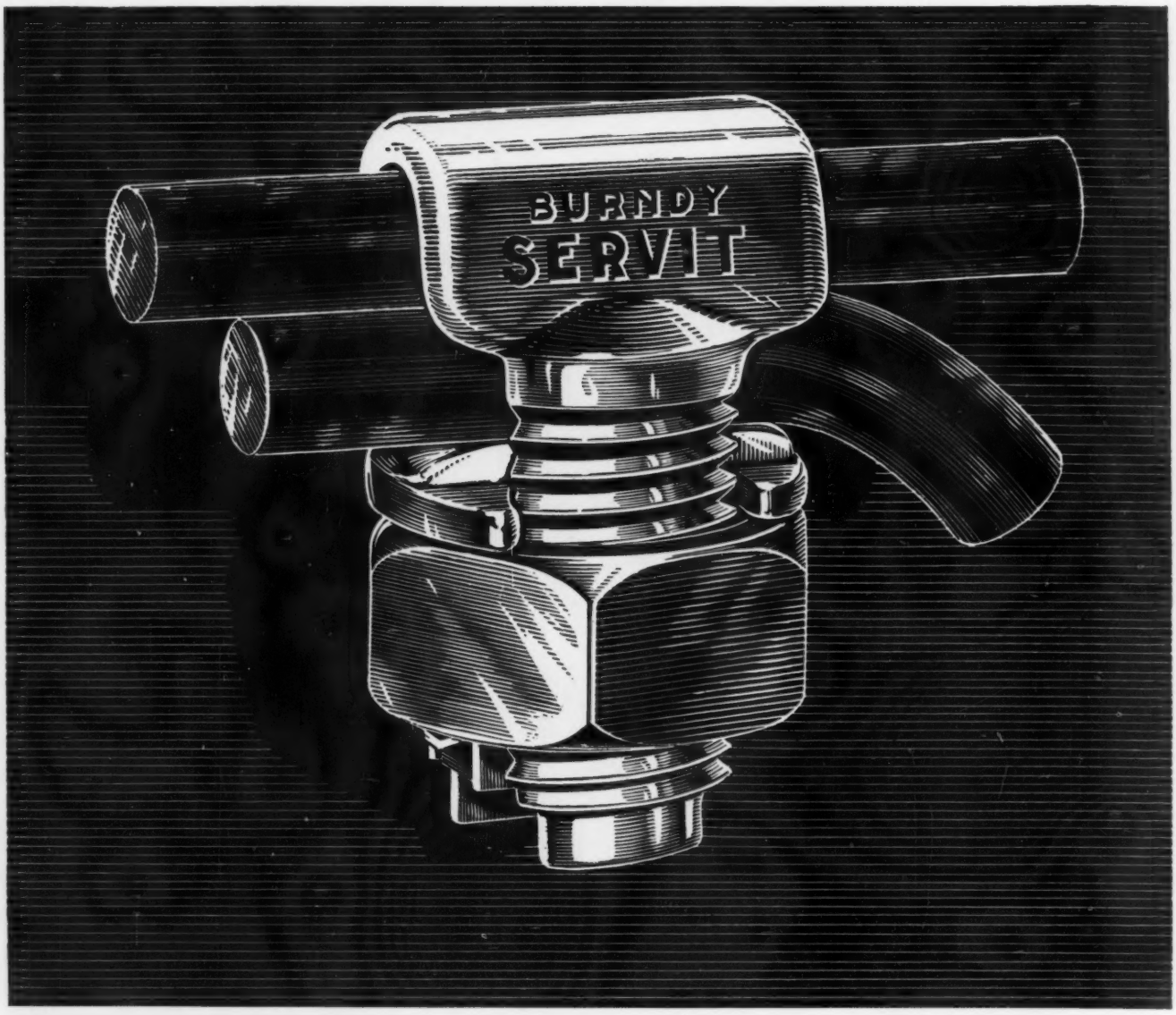
CLEATS

Standard cleats of all sizes and types.

ILLINOIS

ELECTRIC PORCELAIN CO.

MACOMB, ILLINOIS



Burndy Servit . . . universal favorite for taps, dead ends, service entrances, motor leads, junction boxes and ground-wire to neutral connections. Extremely compact, with rounded edges easy to tape. Develops and holds high pressure between conductors. Thirteen sizes accommodate conductors from #10 to 1000 Mcm. Catalog 41 describes SERVIT and other leading Burndy connectors . . Whatever you connect, be sure to . .

Connect with
BURNDY
New York 54, N. Y.

WESTERN BRANCH: Vernon 11, California • CANADA: Canadian Line Materials, Ltd., Toronto 13 • FOREIGN: Philips Export Corp., New York 17, N. Y.

DEPENDABLE
EFFICIENT
ECONOMICAL

Mr. S. E. Thompson, *System Operator*, of the Delaware Power & Light Company, at the remote control console of his G-E 250-watt FM radio station.

2-WAY RADIO PROVES WORTH TO THE DELAWARE POWER & LIGHT CO.

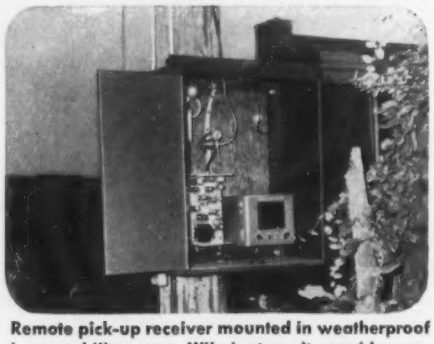
ALL-WEATHER radio communication between control headquarters and mobile crews of the Delaware Power and Light Company is achieved by rugged G-E 30-watt Transmitter-Receiver units.

Blanketing the hilly area serviced by this utility, General Electric 2-way radio enables trucks and supervisors' cars to maintain dependable communication in a region subject to sleet storms and heavy winter ice formation on power lines.

Performance of the initial installation so thoroughly demonstrated General Electric quality that Delaware Power & Light Company has since installed several additional G-E mobile radio units.

A General Electric representative is as near as your telephone. Whatever your radio requirements, he can help you. Call him, or write: *Transmitter Division, General Electric Company, Electronics Park, Syracuse, New York.*

G-E mobile Transmitter-Receiver combination mounted in line truck.



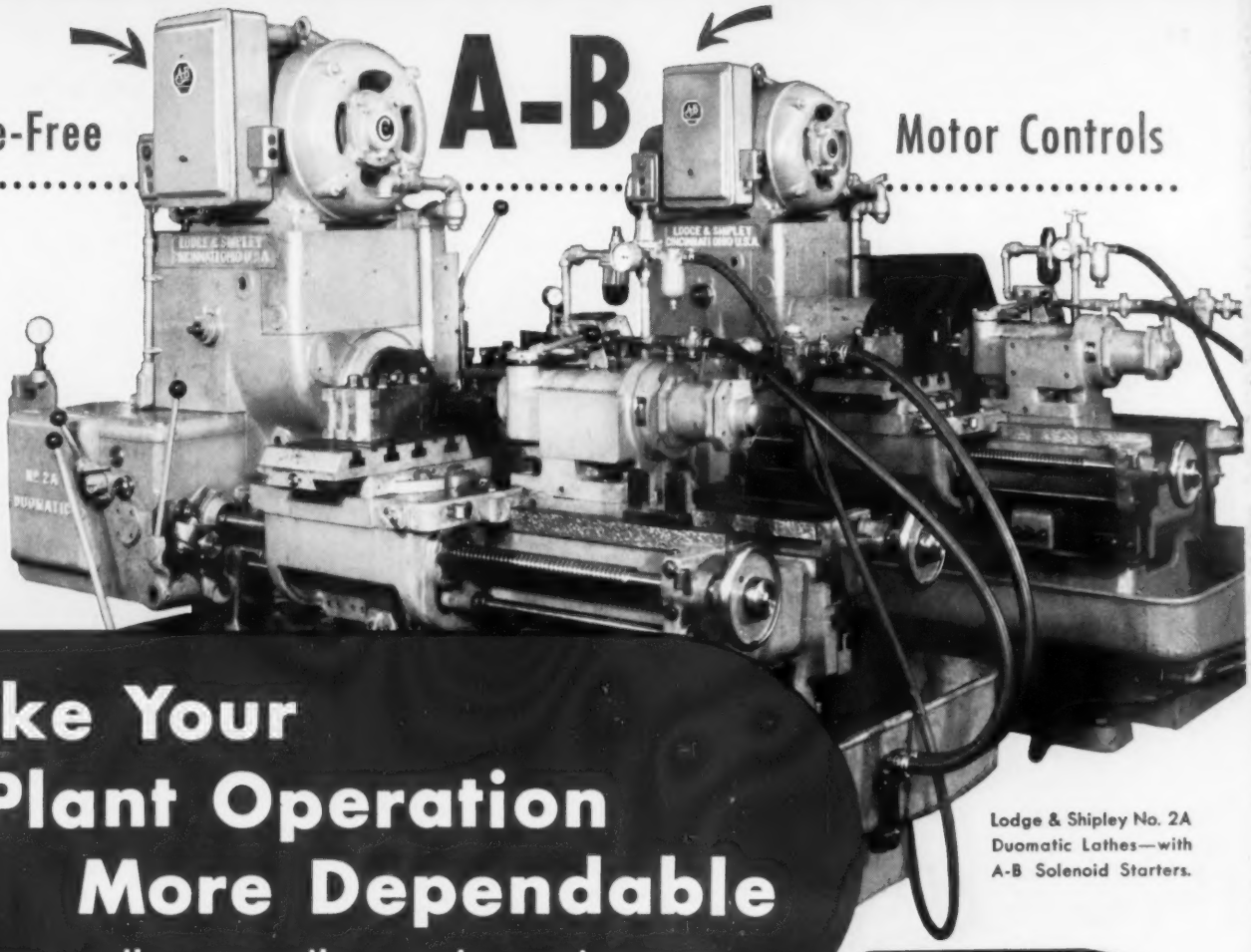
Remote pick-up receiver mounted in weatherproof box on hilltop near Wilmington. It provides extended "talk-back" communication range.

LEADER IN RADIO, TELEVISION AND ELECTRONICS

GENERAL ELECTRIC

163-EA-691

Trouble-Free **A-B** Motor Controls



Lodge & Shipley No. 2A Duomatic Lathes—with A-B Solenoid Starters.

Make Your Plant Operation More Dependable

by using Allen-Bradley Solenoid Starters

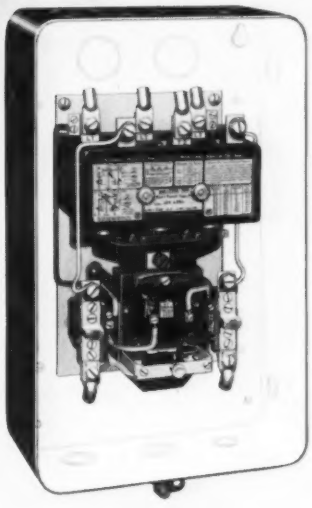
● When a manufacturer of a machine tool like the Lodge & Shipley Duomatic Lathe, shown above, uses A-B motor starters, you can profit from his experience by specifying A-B controls for your plant.

No evidence of A-B acceptance is more convincing than the big Machine Tool Show in Chicago. More than 46% of all motor controls at that show were Allen-Bradley.

In A-B Solenoid Starters there is ONLY ONE MOVING PART. There are no pins, no pivots, no bearings, no hinges. There is nothing to corrode and stick . . . no jumpers to break.

And the patented A-B silver alloy contacts need no cleaning, filing, or dressing. Let us send you a copy of Bulletin 709.

Allen-Bradley Company
1316 S. Second St., Milwaukee 4, Wis.



THERE IS A STANDARD A-B ENCLOSURE FOR EVERY INDUSTRIAL NEED

General Purpose

Dust-tight

Waterproof

Hazardous Dust

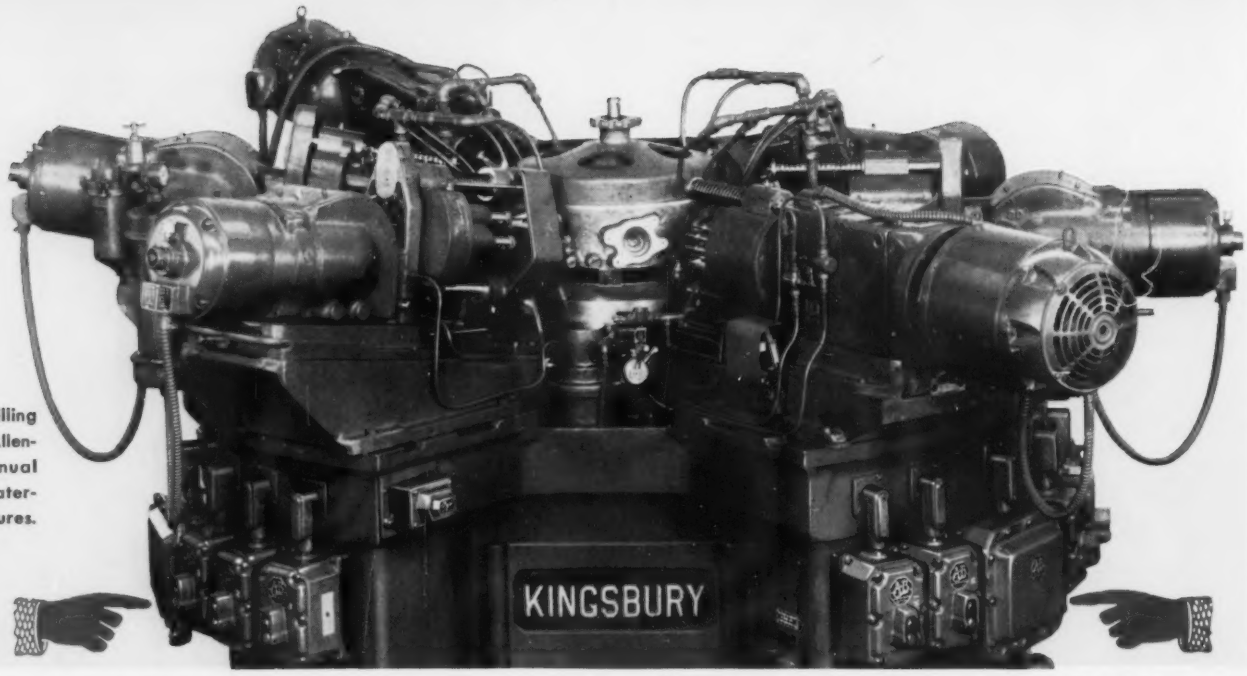
Hazardous Gas

Corrosion Proof

Corrosion Proof

A-B Quality

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL



Kingsbury drilling machine with Allen-Bradley manual starters in waterproof enclosures.

ALLEN-BRADLEY *Waterproof* MOTOR STARTERS

When you need hand-operated motor starters for single- or three-phase motors... look into these advantages of Allen-Bradley Bulletin 609 manual starters:

1—A-B Bulletin 609 starters are simple in design ... quick make-and-break ... therefore, dependable.

2—The silver alloy contacts need no cleaning, filing, or dressing, even after long service.

3—These starters are available in standard enclosures (see below) for any service.

4—They provide accurate overload protection.

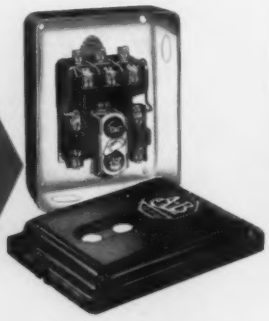
Write for Bulletin 609.

Allen-Bradley Company
1316 S. Second St., Milwaukee 4, Wisconsin

Trouble-Free Manual Motor Starters

For All Types of Industrial Service

Typical Enclosures For Machinery Applications



General Purpose Enclosure

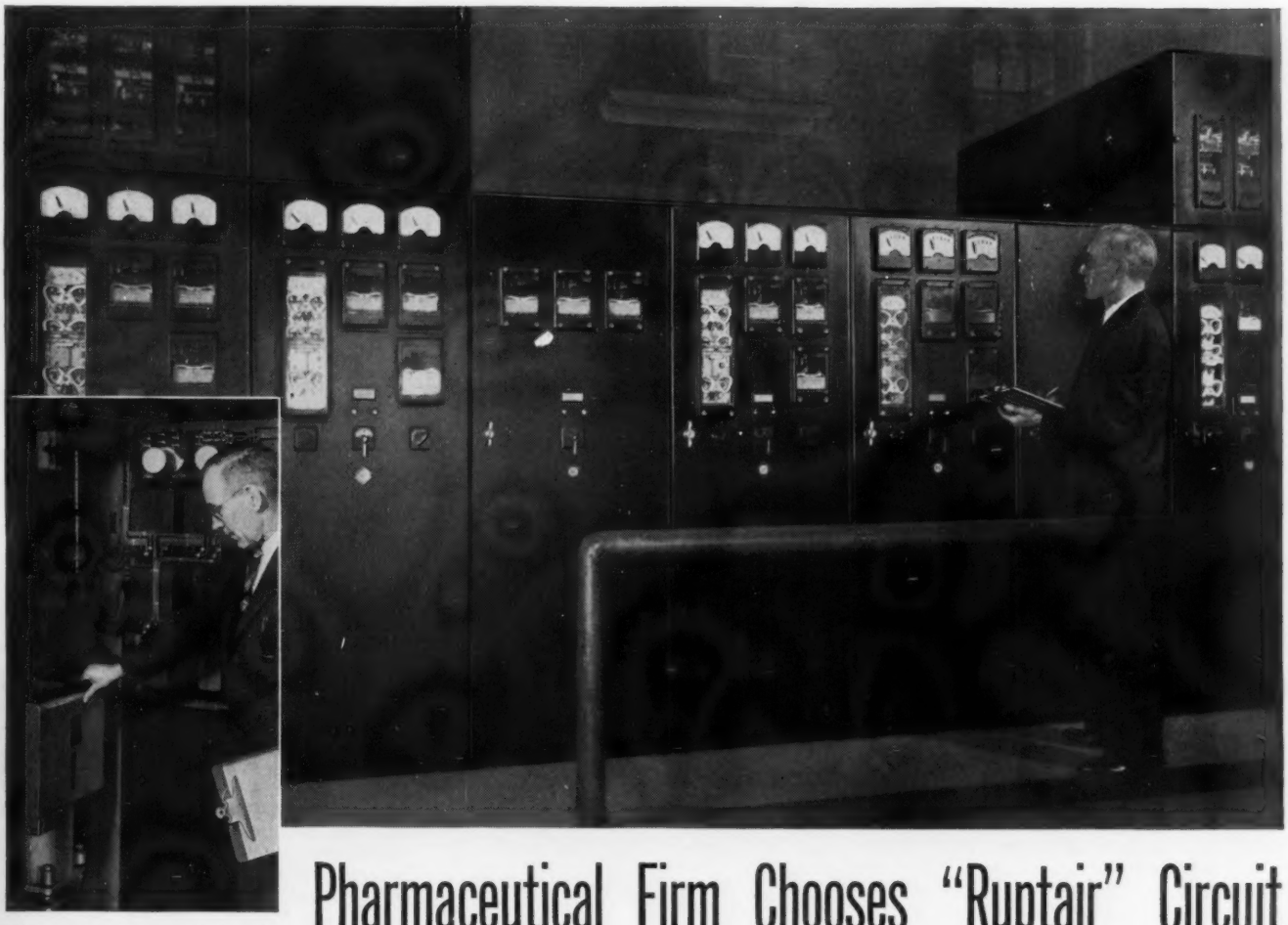
Two types for mounting the starter in machine base with flush cover. Other enclosures also listed.

A-B Quality

ALLEN-BRADLEY

BULLETIN 609 MANUAL STARTERS

RELIABLE METAL-CLAD SWITCHGEAR



Automatic disconnection of contacts, completely enclosed buses, mean safe and easy inspection of the breakers.

Pharmaceutical Firm Chooses "Ruptair" Circuit Breakers to Safeguard Electrical System

COMPLETELY RELIABLE electrical protection is *especially important* in manufacturing medical drugs. To get such protection, one of the nation's largest pharmaceutical firms brought its switchgear problem to A-C. The solution was *Ruptair* magnetic air circuit breakers integrated in Allis-Chalmers metal-clad switchgear. These units, with an interrupting capacity of 150,000 kva each, provide this plant with the complete electrical protection it requires.

* * * * *

It was Allis-Chalmers who first introduced metal-clad switchgear to the U.S. Today, it is Allis-Chalmers who offers one of the world's most complete lines of metal-clad switchgear for all applications. Bring your problems to experts . . . call our nearest office or write: ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2274

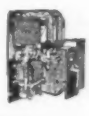
Allis-Chalmers Builds all four Types of Circuit Breakers

AIR BLAST available in interrupting capacities from 250,000 kva to 500,000 kva.

MAGNETIC AIR. A-C trademark *Ruptair.* Capacities: 50,000 to 250,000 kva.

OIL — A-C trademark *Ruptor.* Interrupting. Capacities: 50,000 to 500,000 kva.

LOW VOLTAGE—Metal enclosed dead front; 25,000-50,000 A. I. C., 600 v a-c max



ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

Want 2 more Lifetimes?

KEYLESS CEILING RECEPTACLE — IVORY BAKELITE—250W—250V. For 3¼" and 4" round boxes. Extra ½" oversize design permits safety margin for installation. Rigid terminals; large binding head screws will take No. 12 copper or No. 10 aluminum wire. Light weight, advantage in shipping and handling. Not subject to mechanical stresses found in porcelain. Breakage reduced to minimum. Washer head screws furnished for quick mounting. Listed and Approved, Underwriters' Laboratories, Inc.

KEYLESS FIXTURE SOCKET—660W—250V. *One Piece* Ivory Bakelite. Will not *loosen* when lamp is backed out. No breakage—Easy one piece installation—holds fast. Same Price Class as Porcelain. Listed and Approved by Underwriters' Laboratories, Inc.

Here are two particularly significant additions to Slater's growing list of *LIFETIME* wiring devices.

Like all Slater products, they are engineered and built for adaptability to current construction needs, ease of installation, enduring service.

Contractors can be sure of Slater performance as specified. Wholesalers can sell Slater's nationally advertised line with the extreme confidence that goes with *LIFETIME* quality.

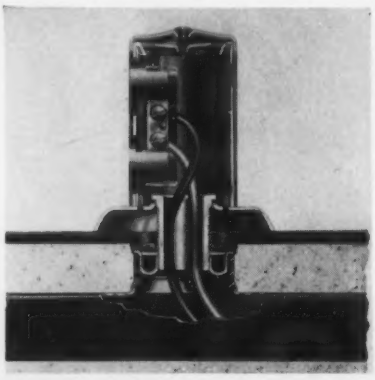
Write for complete Wiring Device Catalog.

Slater
ELECTRIC & MFG. CO.
WOODSIDE, NEW YORK
Lifetime wiring devices

PRODUCT NEWS

Underfloor Duct (100)

National Electric Products Corp. is marketing a simplified Nepcoduct system of underfloor duct, featuring a 1½-in. standard pipe threaded outlet. The system incorporates a single size 14-gage steel underfloor duct, 1⅜ x 2⅞ in. It is supplied in 10-ft. lengths and is available with either black enamel or Sherardized rustproof finish. Brass service fittings have standard T-slot, 3-pole or duplex receptacles for high-potential light



and power connections. Low-potential service fittings are designed for telephone communication or similar wiring and can accommodate terminal blocks, buzzers, bells and other small signal devices. For specific applications the company will supply on special order a 2⅜-in. T-type outlet. No special tools are required for installation; marker screws are omitted from the duct assembly but are available when desired. Underwriters' approved.

Phase-Shifting Transformers (101)

Westinghouse has a line of adjustable phase-shifting transformers which will convert standard watthour meters to kva.-hour meters by the displaced voltage method. The new transformers shift the voltages by 0, 30, 45 and 60 degrees corresponding to 100, 86.6, 70.7 and 50% power factor respectively, depending upon the position of movable plugs inserted in radio-type sockets built into the units. Use of the transformers is based on the fact that, by shifting the phase angle of the voltage a proper amount, any watthour meter can be made to read kva. hours.

Five types are available: Type K-12 for 2-phase, 3-wire connections; Type K-13 for 3-phase, 3-wire connections; Type K-14 and K-18 for 3-phase, 4-wire connections and Type K-17 for 3-phase, 4-wire delta connections.

Voltage Tester (102)

Ideal Industries has a new voltage tester for continuity of circuits, 110 to 550 volts a-c, 110 to 600 volts d-c, blown fuses, grounded side of line, grounded side of motor or appliance, excessive leakage to ground, frequency (25 or 60 cycles), and d-c polarity. Indications are by a solenoid indicator and a neon test lamp, operated independently.

Here's Proof of No Problems with ALUMINUM

No Problems of Conduit Layout

No problems of conductivity

No problems of joints and terminals

No problems of availability

Here's proof that wire and cable installations with Alcoa E.C.* Aluminum Conductors present NO CONDUIT PROBLEMS! Compare the conduit sizes for identical requirements of aluminum and copper motor leads! In four out of five cases, the conduit sizes are identical. In the remainder, only a simple change to the next conduit size is required.

And insulated aluminum wire and cable are lighter—easier to pull. Not only in conduit, but on overhead, service entrance, or anywhere a conductor must go, you'll reduce your distribution investment if you *figure it in aluminum*. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh 19, Pennsylvania.

*E.C.: *Electrical Conductor* Aluminum

THE BIG DIFFERENCE IS IN YOUR COSTS!

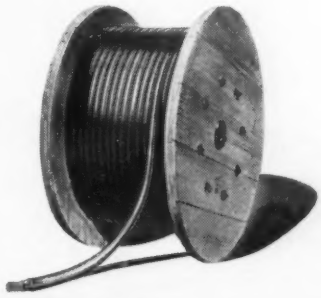
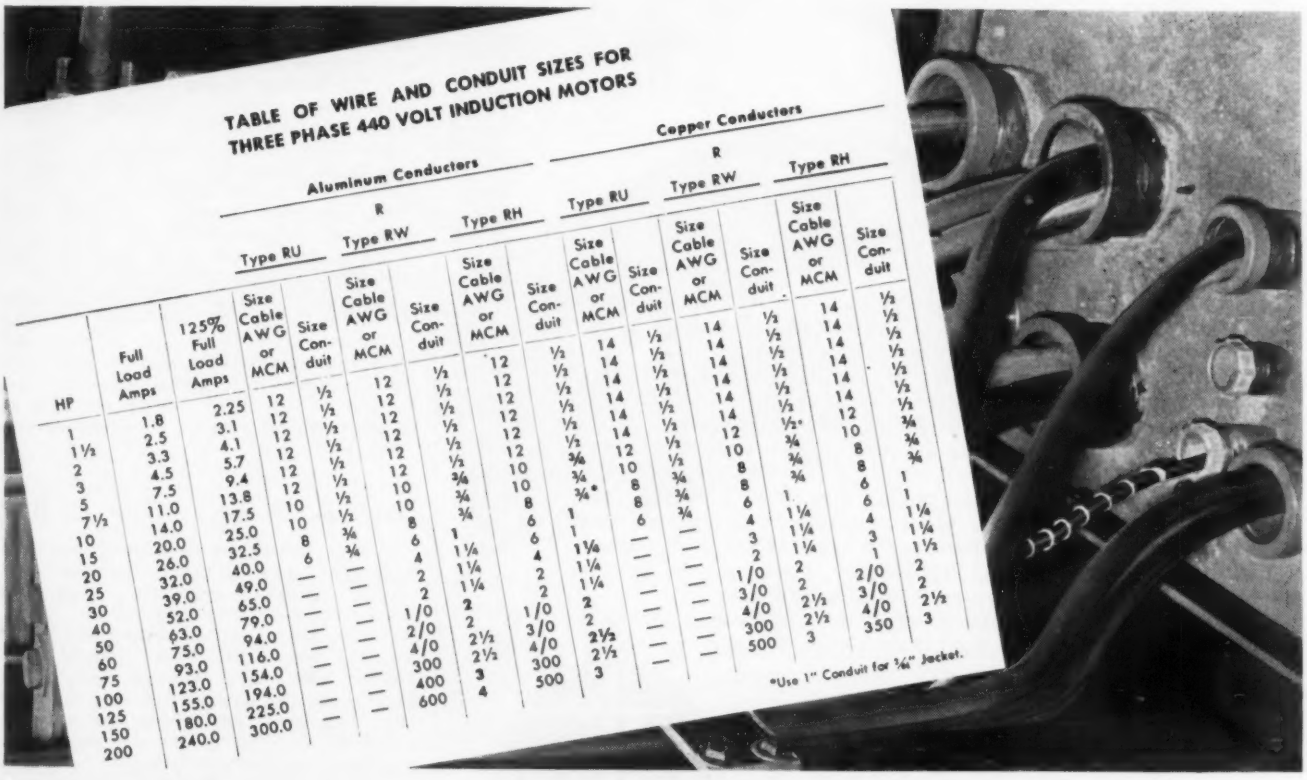


TABLE OF WIRE AND CONDUIT SIZES FOR THREE PHASE 440 VOLT INDUCTION MOTORS

			Aluminum Conductors						Copper Conductors					
			R						R					
			Type RU		Type RW		Type RH		Type RU		Type RW		Type RH	
HP	Full Load Amps	125% Full Load Amps	Size Cable AWG or MCM	Size Conduit	Size Cable AWG or MCM	Size Conduit	Size Cable AWG or MCM	Size Conduit	Size Cable AWG or MCM	Size Conduit	Size Cable AWG or MCM	Size Conduit	Size Cable AWG or MCM	Size Conduit
1	1.8	2.25	12	½	12	½	12	½	14	½	14	½	14	½
1½	2.5	3.1	12	½	12	½	12	½	14	½	14	½	14	½
2	3.3	4.1	12	½	12	½	12	½	14	½	14	½	14	½
3	4.5	5.7	12	½	12	½	12	½	14	½	14	½	14	½
5	7.5	9.4	12	½	12	½	12	½	14	½	14	½	14	½
7½	11.0	13.8	12	½	12	½	12	½	14	½	14	½	12	½
10	14.0	17.5	10	½	12	½	12	½	14	½	14	½	10	¾
15	20.0	25.0	10	½	12	½	12	½	14	½	14	½	8	¾
20	26.0	32.5	10	½	12	½	10	¾	12	½	14	½	8	¾
25	32.0	40.0	8	¾	10	¾	10	¾	10	¾	12	½	8	¾
30	39.0	49.0	6	¾	8	¾	8	¾	8	¾	10	¾	6	1
40	52.0	65.0	—	—	6	1	6	1	6	1	8	¾	4	1
50	63.0	79.0	—	—	4	1¼	4	1¼	4	1¼	6	1	3	1¼
60	75.0	94.0	—	—	2	1¼	2	1¼	2	1¼	4	1	1	1½
75	93.0	116.0	—	—	2	2	2	2	1	1½	3	1¼	2/0	2
100	123.0	154.0	—	—	1/0	2	1/0	2½	2/0	2	2	1½	3/0	2
125	155.0	194.0	—	—	2/0	2½	3/0	2½	3/0	2	1	2	4/0	2½
150	180.0	225.0	—	—	4/0	3	4/0	3	4/0	2½	2/0	2½	350	3
200	240.0	300.0	—	—	300	3½	300	3½	300	3	3/0	3		
					400	4	500	4	500	3½	4/0	3½		
					600	4					300	4		
											500	4		

*Use 1" Conduit for ¾" Jacket.



ALCOA EC ALUMINUM

FOR ELECTRIC WIRE AND CABLE

KLEIN TOOL BELTS

"KLEIN-LINE" BELT
New design with "Klein Kord" Sliding Trace that allows movement of approximately 6 inches in either direction. Reduces chafing and safety strap wear. Comfortable latigo leather cushion. All sizes.

"KLEIN-KORD" BELT
Made of "Klein-Kord," the material made famous by Klein Red Center Safety Straps. Wide, comfortable fabric cushion. All sizes.

★ To the lineman a fine tool belt is more than a necessity—it is a proud possession that assures safety, comfort and convenience—is essential to efficient work.

Klein Tool Belts—favorites among linemen—are made in a range of styles and sizes to suit individual preferences and requirements. Advantages of Klein Belts include tested "Dee" rings drop forged from the finest steel . . . hand-set rivets of solid copper . . . lock stitched sewing with hot waxed thread . . . convenient tool loops . . . plier pocket, tape thong and knife snap.

Illustrated here are two recent additions to the complete line of quality Klein Tool Belts—the "KLEIN-LINE" Belt with the sliding trace and the "KLEIN-KORD" Belt made of multiple plies of long staple cotton vulcanized in rubber.

To assure the last word in comfort, convenience and safety be sure to specify Klein Tool Belts.

Ask Your Supplier
Foreign Distributor: International Standard Electric Corp., New York

A copy of the Klein Pocket Tool Guide, showing the Klein line and containing valuable tool information, will be sent on request.

KLEIN TOOLS EST. 1857 TRADE-MARK REG.

Since 1857

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

Time Switch (103)

Sangamo's Type S time switch is approximately 3 in. wide, 5⅜ in. high and 3 in. deep. It is powered by a newly developed high-torque, synchronous, self-starting, low-speed motor which is lubricated for life; is designed for easy mounting on a standard switch box or for surface mounting on any wall; is available in ivory or brown.

Plastic Anchor (104)

Holub Industries is making the Sandscott plastic expanding screw anchor. According to the announcement, these anchors may be used with wood or lag screws for fastening in any material. Overlapping internal and external slits give "concertina" expansion for holding power. The anchors are made slightly larger in diameter than the hole size to be drilled.

According to the manufacturer, plastic used in the anchor has a tensile strength of 5,000 lb. per square inch; is unaffected by water, moisture, weather or acids; will withstand temperatures to 78° below zero or up to 180°F; has good electrical characteristics.

The anchors are available in seven sizes in various lengths to accommodate screw sizes from No. 5 to No. 20 or ¼-in. and 5/16-in. lag screws. They may be cut to required length with pliers, knife or saw. Packed in cartons of 100 or available in an assortment of sizes in a transparent sectional plastic kit.

Tank-Type Cleaner (105)

Ideal is making an all-purpose, industrial tank-type cleaner for general vacuum cleaning, dust collecting and water pick-up. This cleaner has a self-contained filtering system. Incoming air is whirled around inside the tank and heavy particles are deposited there. The air then passes through a cloth bag filter where the dust is removed. Collected dirt is emptied by raising the vacuum-sealed lid and lifting out the 9-gal. tank and dust bag. Power is provided by a 1½-hp. continuous-duty motor. Construction is of 16-gage steel with Hammerloid finish. A 30-ft. primary cord gives 2,700 sq. ft. of coverage from a single outlet.

Brush Kit (106)

Ohio Carbon Co. is offering a transparent small-motor brush kit. Designated as Kit No. 9, it contains 168 brushes, 40 springs, 10 wicks.

Sure, selling a top-quality wiring job is a tough deal when customers can't tell an ampere from an ohm. But here's a brand-new focal point for your sales story—silence and smooth action —*features you can demonstrate!*

With its new 10-ampere, 125 volts, T-rating, this new mercury switch opens up new fields for silent switch applications, matches quiet operation to today's heavy loads. It's a long-life, specification-grade switch, made well to do its job well — *another G-E first* — to help you sell more top-notch wiring jobs.

And, when you're talking high-quality wiring, remember the selling power of the General Electric name. It identifies a complete line of wiring devices which your customers know they can trust. Ask your General Electric merchandise distributor about the new mercury switch and the rest of this complete line. Section D1-125, General Electric Company, Bridgeport 2, Connecticut.

GENERAL ELECTRIC

HEY!
WHY ALL THE HURRY?

Just heard about the

SECOND ANNUAL INDUSTRIAL ELECTRICAL . . . SHOW . . .

MARCH 18-19-20, 1948
at
THE LOS ANGELES ARMORY

and I don't want to miss it !

Sponsored by
The Electrical Maintenance Engineers Association of Southern California, Inc.

Time Switch (107)

Paragon Electric Co.'s Plug-In, latest in its line of poultry house time switches, is designed for smaller operations and provides for the evening dimming period before lights are turned off. A 6-ft. cord plugs into a convenience outlet and extension cords for bright and dim lights are plugged into receptacles at the sides of the case. Installation time is said to be less than 30 minutes. The manufacturer suggests its use to control barn hay drying, yard lights, water pumps and other farm equipment, when not required for hen house lighting.

Low-Voltage Control System (108)

Square D Co. announces Saflex low-voltage control system using a 24-volt control circuit. System consists of a small mechanically latched, electrically actuated relay for control of 120-volt a-c circuits and a 24-volt, a-c single-pole, double-throw, automatic center return, flush or surface mounting, lever-type control switch. Approved by Underwriters' Laboratory, it provides multiple control without three- or four-way switches, requires no metallic conduit, and is easy to install in new or existing buildings. It is also readily adaptable to master control systems, whereby any number of rooms can be lighted from a single control point.

Tachometer (109)

A new hand-held electric tachometer weighing 3 lb. has been announced by General Electric. It is designed to give accurate and direct readings of linear speeds from 10 to 10,800 f.p.m. and of rotational speeds from 100 to 10,000 r.p.m. Using accessories, rotational speeds from 10 to 100,000 r.p.m. may be measured.

This tachometer consists of two units—the head, which is placed in contact with the moving object, and the indicating unit to which the head is attached by a flexible electric cable. Speed ranges may be changed while the spindle is rotating.

Electrode (110)

A hydrogen-free, mineral-type, extrusion coated electrode claimed to eliminate underbead cracking is available from Westinghouse in diameters from ¼ to ⅛ in. These electrodes are recommended by the manufacturer for use with d-c reverse polarity or for a-c.

Lighten the heart of your lighting system

STYLE PAYS off in your lighting panels, too, as these two examples of progressive BullDog engineering are proving every day.

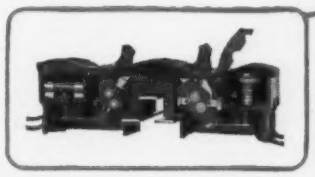
Utility plus good looks

BullDog *Superba* Panelboards—fine appearance and good performance.

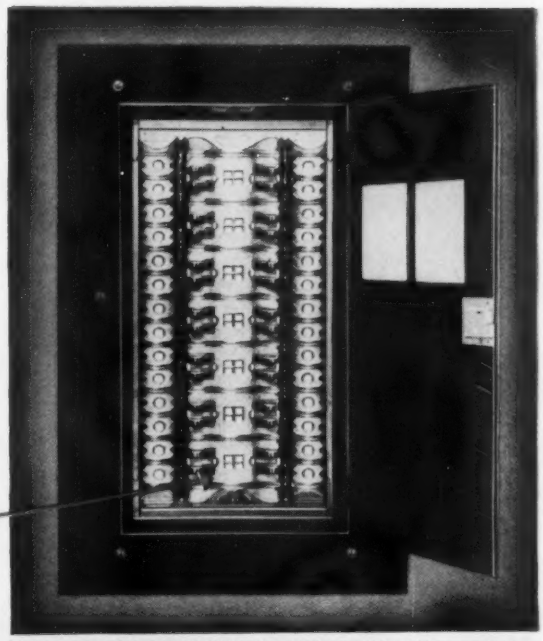
Standard Superba has fuse doors interlocked with switch handles. Makes fuses "dead" before they become accessible.

Modified Superba has advantages of Standard, except for safety fuse doors. For installation where service is performed by an *electrician.*

Both panelboards have exclusive OMNI-bus feature and heavy-duty toggle switches (with quick-make and quick-break action).



Cutaway view of standard SUPERBA phenolic unit, featuring OMNI-bus bars, rugged toggle switches—all adding to the appearance and utility of this lighting panel line.



Ruggedness first

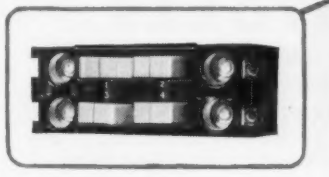
BullDog *Rocker Type* Panelboards . . . for heavy-duty performance. Good appearance, while secondary, is not overlooked.

BullDog *Rocker Type* has branch circuits of molded material . . . arc-resisting, non-carbonizing, and non-tracking.

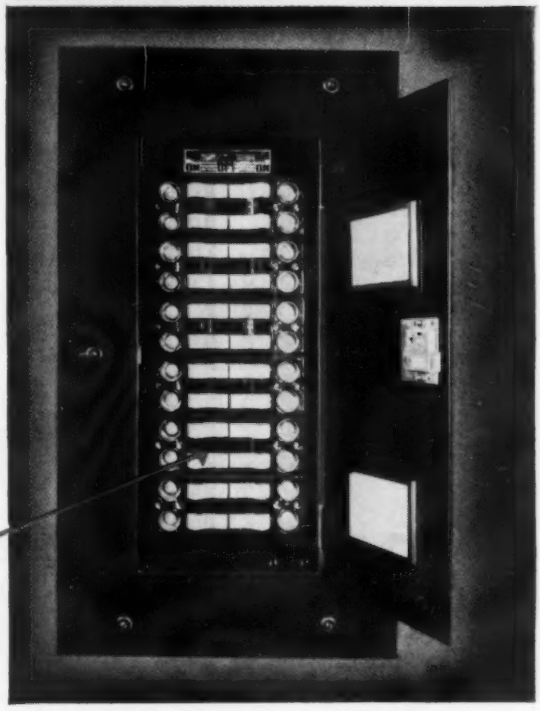
Breakage of switch handles is at a minimum in rugged *Rocker Type* Panelboards. Quick-make and quick-break, with smooth-working, knife-edge bearings.

When your lighting set-up calls for a panelboard that must "take it," specify BullDog *Rocker Type.*

For full technical information on BullDog SUPERBA or ROCKER TYPE Panelboards, call a BullDog Field Engineer. There's one nearby who will be glad to answer your questions.



Close-up of ROCKER TYPE molded unit, designed for durability, maximum dielectric strength, and heat resistance . . . plus a simplified switch mechanism with durable rocker handles.



BullDog's Field Engineers welcome the chance to sit in on planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation and maintenance costs, as well as highest efficiency and reliability in actual operation. Why not take advantage of this pre-building service?

BullDog manufactures Vacu-Break Safety Switches • SafTo-Fuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution DUCT • "Plug-In" Type BUStribution DUCT • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

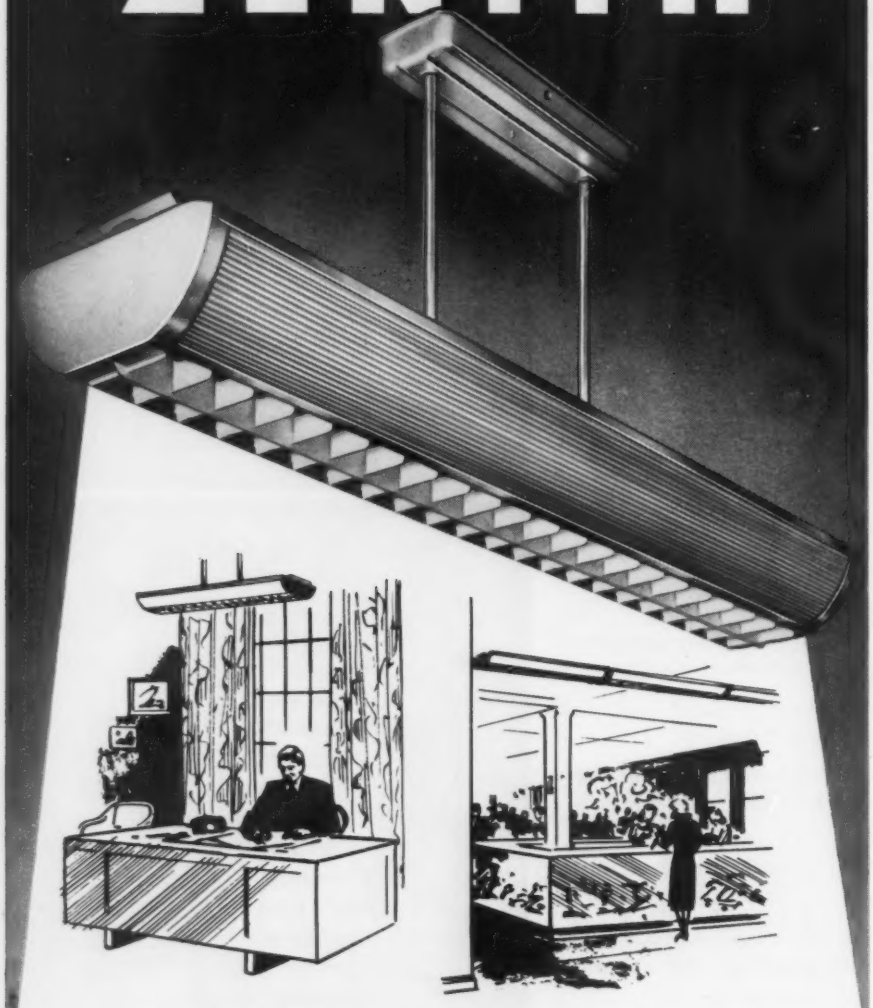
Coast Electric & Manufacturing Co.
1720 N. E. Sixth Avenue Tel., Garfield 2844
Portland, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel., Hemlock 1-2470
San Francisco, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel., Jefferson 2224
Los Angeles, Calif.

Planned Lighting with

ZENITH



OFFICES . . . STORES

Here's a commercial fluorescent luminaire that's engineered for superlative lighting performance—yet costs only a very little more than conventional equipment. Precision formed on precision tools, the Zenith installs easily, services quickly. Polystyrene plastic side panels are light, strong and shatterproof. The shielding unit controls the light for greatest effectiveness, with a minimum of of surface brightness. The Zenith may be installed individually as shown, or in continuous mounting.

Write for the new Zenith catalog sheet

Offices in Principal Western Cities

SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD CALIFORNIA
MADE IN U.S.A.

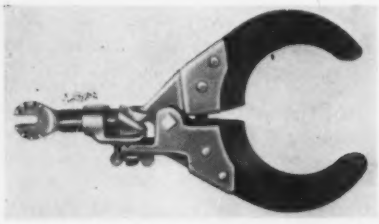
Branch and Warehouse in San Francisco

FOR THE BEST IN INDOOR AND OUTDOOR LIGHTING IT'S SMOOT-HOLMAN

Insulator Fork (111)

A. B. Chance is making a fiber-jawed adjustable insulator fork which attaches to an insulated Universal pole and is used to control 8- and 10-in. deadend insulators while making insulator changes on energized lines. It can be used also to raise most pin-type insulators weighing up to 15 lb., the manufacturer reports.

Jaws may be opened or closed by turning the Universal pole. A wing nut and groove arrangement on the aluminum alloy casing permits the jaws to be set at 0, 30 and 60 degrees to the spline screw so that pin-type insulators my be placed in position on a crossarm.



Terminal Block (112)

Curtis Development & Mfg. Co. is offering a feed-through terminal block, with both screw and solder connections. Each terminal is mounted in bakelite and held in a metal strip. Number of terminals from one to 16 may be specified. Over-all length of a 10-terminal block is 7¼ in.; height, including screw and solder connections, is $1\frac{5}{16}$ in.; width is 1 in. This block can be used in circuits carrying up to 300 volts, 20 amp., according to the manufacturer.

Cable Cutter (113)

Mathias Klein & Sons has introduced a co-axial cutter which shears clean and flattens cable ends in one operation. It is designed for one-hand operation, operates on a shear principle with a convex blade working against a straight blade. Both .275-in. O.D. and .270-in. O.D. co-axial tubes are accommodated. This cutter measures 8¾ in.; long handles are tempered steel drop forgings; blades are replaceable.

Television Capacitor (114)

A television voltage doubler capacitor, T-121, with a dual .075 MFD capacity and voltage rating of 7,500 VDC has been added to the Cornell-Dubilier line. This capacitor is said to be equally well suited for precipitator, voltage doubler power supplies and photoflash equipment. Type T-121 is built into a rectangular container $3\frac{3}{4}$x$4\frac{9}{16}$x5½ in., with over-all height of 8½ in. to top of terminals. It is equipped with brackets for upright or inverted mounting.

Soldering Iron (115)

Lenk Mfg. Co. is making a gun-grip soldering iron, which is molded from bakelite for light weight. According to the manufacturer, the low heat conductivity of the plastic protects the user from the heat developed in the iron.

NATIONAL ELECTRIC IPI* BUS

Saves You Money!

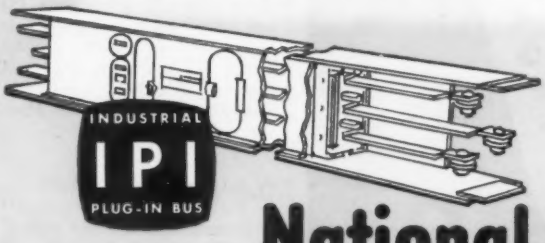
***Industrial Plug-In Bus for Electrical Distribution**

This man is reaching overhead to **plug-in** additional production machinery to the electrical distribution system. Below him all the other machines in the line *continue running.* Because his plant has N.E. Industrial **Plug-In** Bus, motorized equipment can be added or removed any time *without shutting down the production line!* The Plug-In device he is holding was connected to the machine before being brought into position.

Besides permitting production to roll ahead while this man changes equipment, *IPI Bus* saves you money in other ways:

1. **Eliminates the necessity of distribution panelboards.**
2. **Every foot of the distribution system is usable—machines can be plugged in anywhere along the busway.**
3. **It is self-contained and 100% salvageable.**

Let us assist you in determining how this efficient distribution system can best be installed to meet your requirements. Call our nearest sales office, or write for IPI Bus literature *today.* National Electric Products Corporation, Pittsburgh 30, Pa.



Everything in wiring points to NE

National Electric Products Corporation
Pittsburgh 30, Pa.

USE BRIEGEL
ALL-STEEL
INDENTER-TYPE
FITTINGS!
BRIEGEL
NO.
Cross Section
Showing
Indentations.
Select the best, insist on Briegel All Steel Fittings, the only approved Indenter type connectors and couplings for thin wall conduit tubing. You will not only find that Briegel Indenter Fittings are easier and faster to use, but also make neater, stronger connections. Two Easy Squeezes and they're set. Start using Briegel Fittings today. Have more satisfied customers — more profits from each job.
DISTRIBUTED BY
The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport, Conn.; The Steelduct Co., Youngstown, Ohio; Enameled Metals, Pittsburgh, Penn.; National Enameling & Mfg. Co., Pittsburgh; Penn.; Canadian General Electric Company, Ltd.
All B-M Fittings Carry the Underwriter's Seal of Approval and Canadian Standards Ass'n Approval No. B275.
STRONGER • APPROVED •
NEATER • FASTER •
BM
BRIEGEL METHOD TOOL CO.
GALVA, ILLINOIS

Comparator (116)

An electronic instrument for comparison of magnetic or non-magnetic metal parts with a standard has been designed by G-E. Parts appearing alike but differing in composition may be separated quickly, according to the announcement. The device has been used to differentiate between annealed and unannealed steel bars and to sort finished metal parts with different compositions or heat treatments.

The comparator employs a balancing network and indicating instrument mounted in a steel cabinet to which is connected an external test coil. In operation, a reference specimen is placed in the test coil and adjustment made to secure the initial balance. This is indicated by a zero reading on the indicating instrument. After the reference specimen has been removed, the parts to be tested are inserted one by one. As many as 1,500 small parts may be tested in an hour, the manufacturer states.

Motor (117)

The Westinghouse single-phase, all-steel Life-Line Farmotor is available in 1, 1½, 2, 3, 5 and 7½ hp.; is a capacitor-start, induction-run, single-phase motor with self contained capacitor and transfer switch.

The 1-, 1½- and 2-hp. motors have built-in manual reset thermostatic protection against excessive internal temperatures. Motors are available for 60-cycle, single-phase, 220-volt service. They are said to operate successfully at normal frequency and rated load with voltage 10% above or below nameplate rating. Operating speed is 1,740 r.p.m.

Amplidyne (118)

G-E is making an electronic amplidyne consisting of a high-gain balanced d-c electronic amplifier and a motor amplidyne. Designed for use as a regulated adjustable-voltage power supply for d-c motors up to 1½ hp. and as a regulated exciter for larger adjustable-voltage drives up to 200 hp., the new equipment has an output of 1½ kw., 250 volts. It is arranged for use on either a 220- or 440-volt, 3-phase, 60-cycle power supply. According to the manufacturer, this electronic amplidyne makes possible a speed range of 20 to 1 or greater.

Airbreak Switches (119)

A new line of 200-amp. airbreak switches, Type A-R, is being offered by the Hi-Voltage Equipment Co. for four voltage capacities: 7,500, 15,000, 23,000 and 34,500. This line is intended primarily for rural service work. Switch base and insulator supports are rolled steel sections, welded into a rigid unit. All four models are built on 3-in. bolt circle NEMA standard insulators. Contacts are self-aligning, line-type enclosed by a sleet hood, which acts also as a guide for the switch blade.

D-C Relay (120)

A multi-contact d-c relay capable of handling as many as 12 circuits in a variety of contact combinations has been announced by G-E. Working from five basic contact arrangements, contact combinations may be stacked to satisfy intricate circuit switching requirements. Silver, palladium or tungsten contacts can be supplied. More than 500 different coils are available for use in the relay, with ratings from 1 to 250 volts and from 0.1 to 26,000 ohms.

. . . the new Benjamin

LUMINOUS LOUVER CEILING SYSTEM

SKY-GLO is the answer to the Lighting Plan that calls for *Inconspicuous Lighting* with low brightness . . . *More Beauty* with greater seeing comfort! Designed expressly for offices, stores, show windows and other commercial locations, the new Benjamin development features . . .

NEW LUMINOUS VINYLITE LOUVERS

This new system of translucent louvers does more than reflect light . . . it actually glows with light to form a luminous ceiling of unique beauty and atmosphere. This new Benjamin Sky-Glo System is the latest development in "louverall" lighting. With this system it becomes practical to provide . . .

100 TO 125 FOOTCANDLES

of uniform, diffused and comfortable lighting. Crosswise and lengthwise shielding of 45° eliminates glare and uncomfortable brightness. The Sky-Glo System conceals pipes, ducts and fixtures and substitutes at reasonable cost a . . .

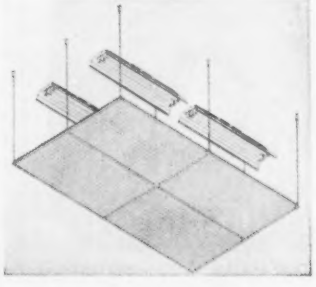
MODERN STREAMLINED CEILING

of low brightness with pleasing architectural and decorative patterns.

Write now for complete Data Bulletin on this new Benjamin development.

BENJAMIN ELECTRIC MFG. CO.
DEPT. J, DES PLAINES 12, ILLINOIS

STANDARDIZED STOCK SECTIONS OF LOUVERS, CHANNELS and FITTINGS simplify the layout and installation of the new Benjamin Sky-Glo System. The four sizes of louver sections and the various channel lengths make possible geometric arrangements which provide wide flexibility of design for various ceilings. Louvers are made of Vinylite, a product of The Bakelite Corporation, which has a light transmission factor of approximately 71%. These sections are easily removed for lamp and fixture maintenance and for easy cleaning.



BENJAMIN TRADE MARK
Lighting Equipment
Distributed Exclusively through Electrical Wholesalers

R-2604 R

BACK AGAIN!
"Sealed Tight"
TROUBLE-LITES

IT EVEN BURNS UNDER WATER!

Yes, "Sealed Tight" Trouble-Lites have burned continuously in water, in test after test . . . positive proof that they are Sealed Tight against all outside elements — water, oil grease and dirt — to insure longer life and trouble-free operation.

- RUBBER-LOCKED SOCKET
- RUBBER-ENCASED SWITCH BUTTON
- HEAVY DUTY GUARD and CUSHION MOUNTING
- ROYAL HEAVY DUTY NON-KINKING WIRE
- ALL-RUBBER PLUG; SPRING ACTION BLADES

CONTENTS OF THIS PACKAGE BEAR THE UL LABEL — UNDERWRITERS LABORATORIES

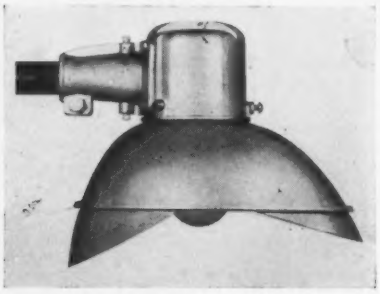
WRITE FOR DESCRIPTIVE FOLDER

ROYAL Quality WIRE • CORD SETS
CARTRIDGE and PLUG FUSES • FUSTATS
TROUBLE LIGHTS • CHRISTMAS LIGHTING SETS

ROYAL ELECTRIC CO., Inc., PAWTUCKET, R. I.

REPRESENTED BY: NORTHWESTERN AGENCIES, INC., SEATTLE, WASHINGTON
ECKERT-LLOYD CORP., SAN FRANCISCO AND LOS ANGELES

Street Light Hood (121)



G-E has announced a new hood, Form 107, for suburban street lighting. Although designed for its postwar line, the hood is interchangeable with older design reflectors, the company states. It is diecast aluminum with side mounting slip fitter for 1¼-in. pipe. Supporting brackets and mounting bosses are so arranged that the hood can be set in a few seconds for either the 4⅜-in. light center, 1,000-lumen lamp or the 5¼-in. light center, 2,500-lumen lamp.

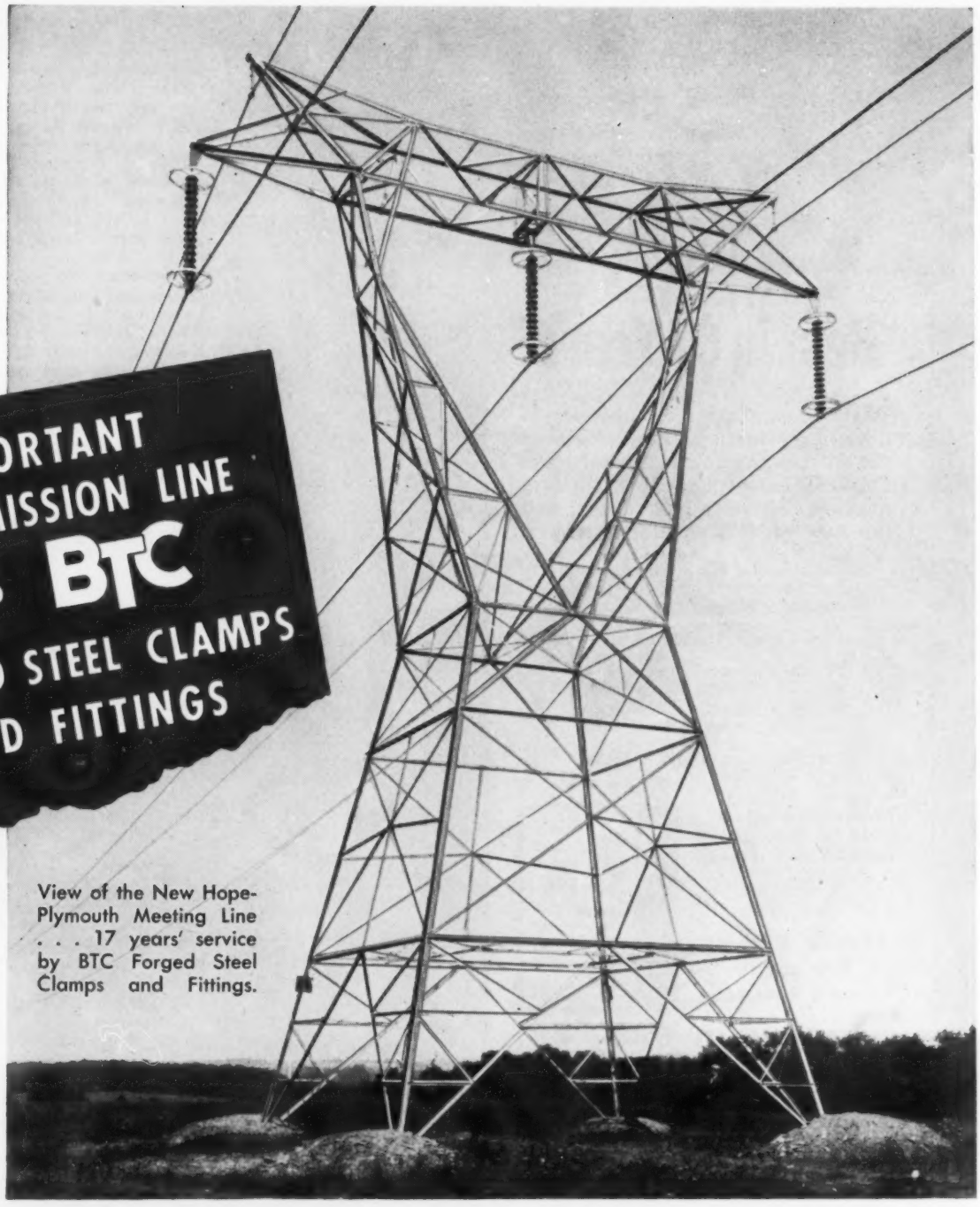
The side-mounting slip fitter mounts directly on a straight or upsweep bracket of 1¼-in. pipe and needs no end fittings or threads. Side mounting is said to provide for as much as a foot greater mounting height of the luminaire for any given height of bracket above the street, and for easier mounting and wiring. The new hood is available also with top-tapped mounting construction to replace the Form 45L hood.

Recessed Light (122)

Associated Lighting Service is manufacturing Westlite recessed circular Fresnel lens Sightlites in sizes from 100 to 300 watts. These new units incorporate the bayonet-locked face plate design developed by Associated. Features of this design are elimination of knurled knobs and round-head screws; removal of plate by a half-inch twist; safety hinges to hold face plate during maintenance. Face plates are spun aluminum with an acid-etched brushed finish; may be painted ceiling color if desired. Plaster rings are supplied. Illustration is Westlight No. 0502, 8⅜-in. diameter Fresnel lens Sightlite for 100-150 watt I.F. lamp.

Floodlight (123)

An improved floodlight for use in home, garage or small business establishment has been announced by General Electric. This Type L-65 takes an ordinary 100-watt lamp and throws a powerful wide-angle beam; features a snap-on ring for the front glass, permitting lamp replacement without use of tools. A steel base allows the unit to stand by itself or permits attachment to wall beam or outlet box. Wing-nuts provide for adjustment in any direction. Weighs 2 lb., measures 8½x7⅛ in.



IMPORTANT TRANSMISSION LINE USES BTC FORGED STEEL CLAMPS AND FITTINGS

View of the New Hope-Plymouth Meeting Line . . . 17 years' service by BTC Forged Steel Clamps and Fittings.

The New Hope — Plymouth Meeting Line is a link in one of the most important utility interconnections serving a densely-populated industrial area.

Built for the Philadelphia Electric Company in 1930 by the United Engineers and Constructors, this 220 kv. line is 29.57 miles long carrying 795,000 cm. A.C.S.R. conductor with armor rods and 203,200 cm. A.C.S.R. ground wire with armor rods. BTC Trunnion-type Cable-releasing Suspension Clamps are used on conductor and overhead ground wires together with miscellaneous BTC Suspension and Strain Fittings. For protection of the tower in case of cable failure, each clamp incorporates a simple, positive cable-releasing device actuated by a predetermined angular displacement of the insulator string or ground wire linkage. BTC Forged Steel Caps are also used on the Suspension Insulators.

This line has had an entirely satisfactory performance record; further evidence of the wisdom in obtaining sound engineering and good materials. For transmission line design, specify BTC Forged Steel Line Hardware.

Sold only through your insulator manufacturer

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"Best in 67 Years"
That summarizes the judgment of dealers and wholesalers who've seen the outstanding new lamp designs in the 1948 Faries line. Repeat orders indicate that lamp buyers, too, find the new models equally attractive.
Desk Lamps . . . incandescent and fluorescent . . . distinctively designed and beautifully finished.
Floor Lamps, Torchieres.
Special Purpose Lamps for general and private offices, hotels hospitals, clubs, schools, etc. Stands for sun and heat lamps.
Industrial Lamps and Brackets.
For maximum volume in 1948 lighting season, display and sell FARIES.
The Faries LINE
Write Today for new No. 48 Catalog
HANDLED THROUGH LEADING DISTRIBUTORS
NO. 65100 TORCHIERE
NO. 65839 "3-WAY" UTILITY
NO. 20025 "GLIDER"
NO. 20101 "CIRCLINE"
NO. 20091
"THE EXECUTIVE"
Faries Manufacturing Company
Decatur. Illinois
PIONEERS IN LIGHTING EQUIPMENT SINCE 1880

F Troffer System (124)

Mitchell Mfg. Co. has announced a fluorescent troffer recessed lighting system built around a basic troffer unit available in two 40-watt, two 40-watt with instant start and three 40-watt fluorescent lamps. The basic troffer may be used as an open type or, by addition of hinged frames, as a glass-shielded or louver-shielded type. It consists of reflector and wireway channel with standard ballasts and starters. In ceilings of tee-bar, snap-in block construction, the formed edges of the basic unit snap into place on the tee-bar. For ceilings of plaster and lath, acoustical tile, etc., simple accessory fittings are provided. End plates and coupling plates have threaded bushings which engage screws; no nuts are required. The basic troffer unit measures 45 in. long, 12 in. wide, 7⅞ in. deep.

Mercury Lamp (125)

A new A-H5 mercury lamp has been announced by G-E to replace the former A-H5 and C-H5 lamps. It is for street lighting and for all general lighting applications in which mercury lamps are desirable. The new lamp is used with a transformer. It may be used in all presently existing equipment as no change is required in auxiliary or fixture dimensions. When used for black light applications, a filter is required.

The lamp is rated at 250 watts and has a maximum outside length of 8 in. Advantages claimed by the manufacturer are longer life; higher lumen-per-watt rating at 100 hours of life; requires stocking only one lamp; can be burned in any position with good life expectancy; has a mechanically attached base, graphite coated; is for black light or general installations.

Marker Light (126)

A day or night marker light said to meet the needs of any class airport is offered by Westinghouse. Designed to CAA Specification L-802, it has a brightly colored cone to identify runway or strip in daytime and a light at top to give elevated marker at night. The marker light can be used on either 6.6-amp. series circuits or 120-240-volt multiple circuits. Five steps of brightness are available from 16 to 1,600 candlepower when a 30-watt series lamp is used and the circuit is controlled by a standard five-step brightness control regulator.

Welding Transformer (127)

A new Type WP 220-440-volt a-c welding transformer designed specifically for the inert-arc welding process has been announced by General Electric. The company states that, while it is especially suitable for welding aluminum, magnesium and beryllium copper in an atmosphere of argon gas without use of flux, the new welder may be used also to weld a wide range of other metals and alloys. It is suitable for both manual and machine operation.

Interference Filters (128)

Solar Mfg. Corp. has a new series of heavy-duty radio interference filters for wiring circuits, screen rooms and industrial electrical equipment. These Type EB filter assemblies have a noise elimination range of from 150 kc. to 250 mc.; are intended for continuous-duty service in 1-, 2- and 3-phase circuits and equipment drawing from 5 to 200 amp., 250 volts a-c/600 volts d-c.

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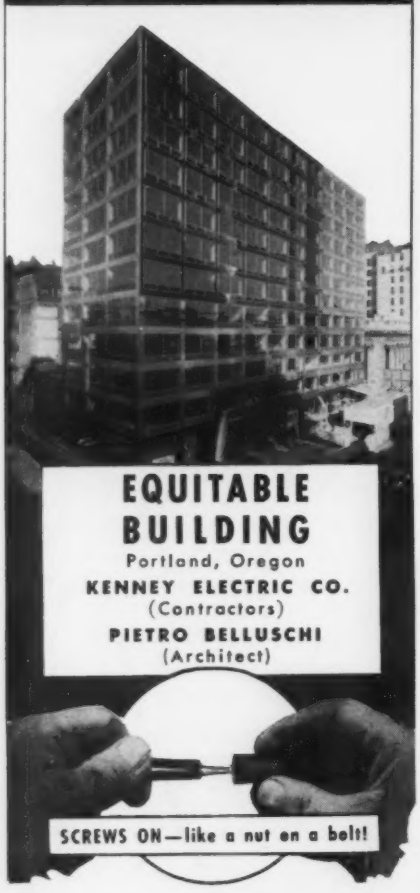
Another Job for "WIRE-NUTS"

SOLDERLESS, TAPELESS WIRE CONNECTORS



R. C. KENNEY, electrical contractor, chose Ideal "Wire-Nuts" to make the many wire joints in the modern new Equitable Building at Portland, Oregon.

Says Mr. Kenney: "Ideal 'Wire-Nuts' are far superior to other methods. They make better joints, and you don't have to mess around with tools or materials. Just a pocketful of 'Wire-Nuts' and you can go right on down the line, making joints up near the ceiling or down near the floor, in cramped quarters or open spaces. It's a lot easier and safer, and it saves considerable money."

Yes, Ideal "Wire-Nuts" *do* give you all these advantages and more! That's why so many millions are being used for new construction, maintenance and repair work. Made in sizes for all usual wire combinations from two No. 18 up to and including three No. 10, solid or stranded. Order from your wholesaler *now*. Mfd. by IDEAL INDUSTRIES, Inc., Sycamore, Illinois.

Wire-Nuts®

(THE SOLDERLESS, TAPELESS WIRE CONNECTORS)
Patented — No. 1,933,555

IDEAL Distributed Through
AMERICA'S LEADING WHOLESALERS

BULLETINS ETC.

Rototrol (129)

What Rototrol is, what it does, and how it works, is outlined in a 36-page booklet on automatic operation for electrical equipment available from Westinghouse. Photographs, schematic diagrams and performance curves are used to describe Rototrol applications in industry. Seven pages of technical information give additional data on the theory, design and operating principles of standard Rototrols and several frequently-used modifications.

Lighting Catalog (130)

The F. W. Wakefield Brass Co.'s Catalog No. 48 shows fluorescent and incandescent lighting equipment for schools, offices, drafting rooms and stores. New items included in the catalog are luminous indirect equipment utilizing Slimline lamps, the improved Grenadier and the Grenadier IV as well as spotlight equipment for accenting in merchandise areas. Photometric data and layout information are given.

High-Current Resistors (131)

Bulletin No. 35 issued by Ward Leonard Eilectric Co. treats the three forms of high-current resistors, Edgeohm, Barohm and Loop-ohm. It describes the types of ribbon resistors for high-current applications and contains data on their resistance values, current-carrying capacities, dimensions, etc.

Heater Price Sheet (132)

Palmer Mfg. Corp. has issued a new price sheet on its wall heaters.

Distribution Transformer (133)

Pennsylvania Transformer Co. has issued an 8-page booklet, No. 1147, on its new EEI-NEMA standard distribution tra. sformer. Mechanical data covering weights and dimensions for the entire range, 25 kva. and below, are included.

Germicidal Lamps (134)

A new six-page booklet describing applications of germicidal lamps in farm buildings has been released by G-E Lamp Department. It employs photographs of actual germicidal installations to illustrate the uses of ultraviolet energy in killing airborne bacteria in buildings occupied by poultry and animals.

Balanced Lag in Fuses (135)

Balanced lag in electrical fuses is treated in a 4-page folder available from Pierce Renewable Fuses Inc.

Rural Transformer (136)

Features of the Allis-Chalmers Type RU rural line distribution transformer are described in a bulletin recently released.

Cord Swivel (137)

Burlington Instrument Co. is offering a bulletin on its newest product, the Safety Cord Swivel.

Testing Instruments (138)

Simpson Electric Co. has prepared a folder on its testing instruments.

Recessed Troffer Lights (139)

A booklet describing the new Westinghouse recessed troffer luminaires has been prepared by that company, is designated B-3959.

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Rome RoZone

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500,000 CM stranded single conductor RoZone insulated, shielded, RoPrene sheathed, power cable....5000 volts

RoZone, the superior ozone-resistant insulating compound, did not just happen . . . it is the result of intensive research and development by "Rome" technicians. Behind it is the accumulated "know-how" of men long-experienced in cable design working with modern and completely equipped facilities.

As an oil-base type compound, RoZone combines exceptional resistance to corona action with high electrical stability in water and long life. It exceeds all requirements of ASTM specification D 574, as well as other severe performance specifications. Specifically, cables insulated with RoZone are unexcelled for high voltage underground or aerial distribution circuits, series street lighting installations, or any high voltage requirement, as well as general purpose wiring *where consistently high quality is a factor.* For circuits of 8000 volts or less between phases and operation at conductor temperatures up to 75° C., RoZone insulation will give you a *new standard* for uninterrupted service and long life. You can specify RoZone with confidence.

COMPARE THESE TEST RESULTS

1. AGING. No appreciable deterioration after exposure to heat or oxidation.
2. INSULATION RESISTANCE. Several times in excess of the ASTM megohm-constant requirement of 2000. Rome Cable has established the standard megohm-constant for RoZone at 5280.
3. DIELECTRIC STRENGTH. Actual long-time test results on RoZone insulation, for 5000 volt services, exceed 400 volts per mil. Surge or impulse strength values of RoZone are equally high.
4. OZONE RESISTANCE. Practically unaffected by exposure to corona or other ozone generating conditions.
5. DIELECTRIC LOSS. Typical test values indicate a power factor less than 4. percent and a dielectric constant under 4.5.
6. ELECTRICAL MOISTURE RESISTANCE. RoZone possesses remarkable stability after long-time immersion periods as exemplified by only minor changes in its electrical characteristics.

RoZone insulation is available in either shielded or unshielded construction with RoPrene (Neoprene) sheath or other conventional coverings to your specification.

Send for your copy of RoZone Specification RO-4 today. In it you will find complete electrical and physical characteristics, as well as results of competitive independent laboratory tests. See for yourself why RoZone is specified by leading utilities and industrials.

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ELECTRA'S HUSBAND

ADVICE TO A YOUNG MAN

"MY boy has finished a two-year hitch in the Navy since he was graduated from high school," one of our dinner guests said recently. "Now he's ready for college. He thinks he'd like to study law and I am recommending that he take engineering. You are something of an expert. What would you suggest?"

"If you mean him," Electra said, nodding in my direction, "forget it. Just the other night he said that if we had a son, he wouldn't recommend that he study engineering."

"You're mistaken," I hastened to retort. "What I said was that I wouldn't expect him to go into the utility business *if* he studied engineering. You will recall that I had some fairly good reasons, too. Bill has the right idea about his son. If I could talk to the lad, I think I could sell him on an engineering career. Law is all right, particularly if he wants to get into politics, but even if he was thinking of a career in government service, engineering would be better."

"You have said yourself that there are too many students enrolled in engineering today," Electra continued. "How can you justify your recommendation?"

"It is possible that the deficit in strictly engineering employment will be eliminated when most of the present crop of students graduate," I said. "Some educators think that this may happen as early as 1950. When you think of the numbers enrolled today, you inevitably reach some such conclusion as that. It is estimated that about 235,000 undergraduate students are enrolled in regular engineering colleges this winter and that another 70,000 students, mostly veterans, are taking two-year pre-engineering studies at junior colleges. Why there are more engineering freshmen in colleges today than there were total undergraduates back in 1940."

"And you still think Bill's boy ought to take engineering," Electra argued, not even allowing our guest to raise a question.

"I do," I reiterated, "and here is the reason why. Good sound engineering training provides a superior background for many occupations not heretofore considered as likely careers by engineering students. Their minds haven't been conditioned to thinking about anything but the conventional types of employment. Just recently one of the deans of engineering made a study of the educational backgrounds of 150 presidents of large corporations, none of which was selected because of a concentration of engineering activities. One-third — by far the largest percentage — were engineering graduates. Time was when lawyers headed the list, but not any more. Another engineering college canvassed the technical manpower requirements of 107 large industrial and business concerns last summer just before graduation. More than half of engineering graduates they were seeking were with field unspecified. These companies were more interested in general abilities and aptitudes than in specialization."

"Those are aspects of the situation that never occurred to me," Bill said. "I hope I can remember them, or better still, you can repeat them to Bill junior."

"I'll gladly talk to him," I said. "Here is another significant point, though. If engineering graduates are going to be more and more in demand for managerial and administrative positions in industry and government, they will have to seek a somewhat broader curriculum than the highly specialized courses of study offered by most engineering colleges. Some of the college people are beginning to wonder if there shouldn't be a difference in the type of education offered an undergraduate who is looking at engineering as the basis for a career rather than a profession. Obviously certain new concepts of training are necessary to provide a different background. Consideration must be given to some of the social and humanistic studies, with maybe a sprinkling of political science and economics."

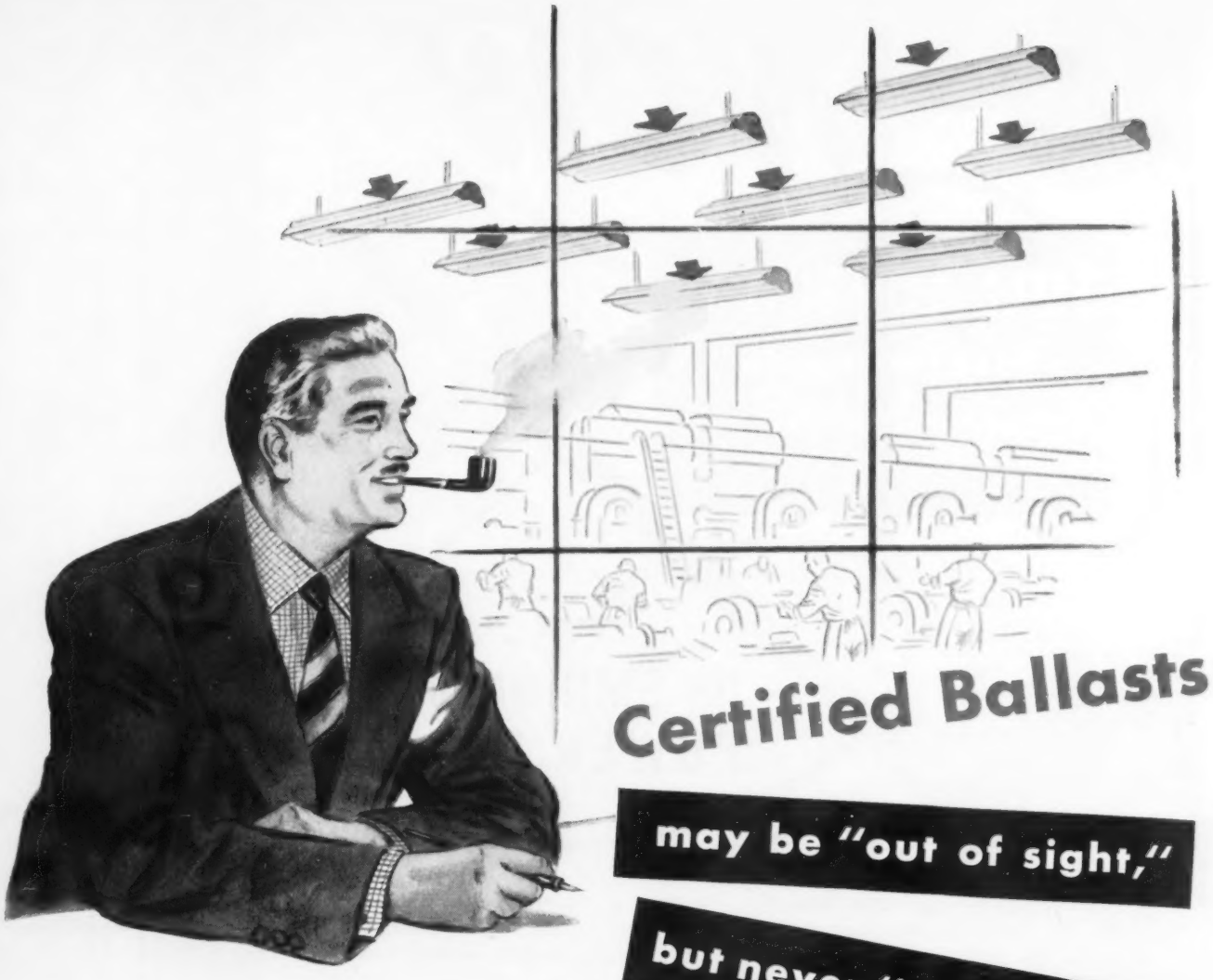
"You've sounded off on that subject before," Electra interrupted. "How engineers ought to be taught public speaking, something about human relations and psychology and how to sell themselves."

"That's right," I continued, "and in some colleges recognition is being given to such requirements. But the need is for a totally new type of engineering curricula. It will come when students, faculties and the public generally better appreciate the distinction between engineering as a preparation for a profession demanding constantly increasing scientific and technological training, and preparation for a career for which a general engineering background is desirable. If engineering trained men are to be looked to more and more for positions of trust and responsibility in managerial activities in industry, business and government, then their educational background must measure up. And it won't unless educators squarely face this new challenge.

"Engineers used to work primarily with materials and physical forces, but today and in the future the behavior of the people whom they enlist to carry out their engineering tasks even, is a major factor in success. That's why it is wise for engineers to prepare themselves to know and understand people for they affect business, managerial effort and above all, politics, and politics affects everything.

"You might advise Bill junor to enroll in an engineering school and then add some courses in history, public affairs, philosophy and economics to the basic sciences and fundamental engineering subjects that he'll have to take anyway. Then at the end of three years he can specialize if he wants to do it. He might not get an engineering degree the way the colleges are now set up, but he'll be better prepared for a job, whether he goes to work for you or for someone else. I only wish that I might have done something like that thirty years ago. No telling where I would be working now."

"I can tell you," Electra said, "you'd probably be working right where you are—you're married to your job and you know it."



Certified Ballasts

may be "out of sight,"

but never "out of mind."

Although a Certified Ballast is usually placed out of sight, its importance can never be overlooked, because top fluorescent lamp performance is so dependent on proper ballast operation.

Certified Ballasts assure maximum lamp performance . . . longer lamp life. They safeguard against overheating . . . eliminate disturbing noise. That's why Certified Ballasts are a "must" in good commercial and industrial fluorescent lighting installations.

Certified Ballasts are better . . . because they are built to precise specifications . . . then tested and checked by Electrical Testing Laboratories, Inc., against these specifications. Only when they pass this testing are they *certified.*

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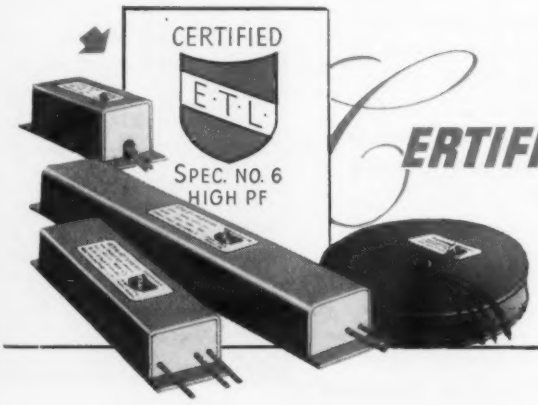
Certified Ballasts are used in all Fleur-O-Lier fixtures and in Certified Lamps with circline tubes.



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1. Where high short circuit currents are encountered—possibly, for example, involving as high as 1,000,000 kva (3-phase basis, symmetrical current) for one fuse at 138,000 volts, or 2,300,000 kva for two fuses in series at 230,000 volts.

2. Where short circuit currents are of intermediate magnitude—and down to the lowest current which will melt the fusible element.

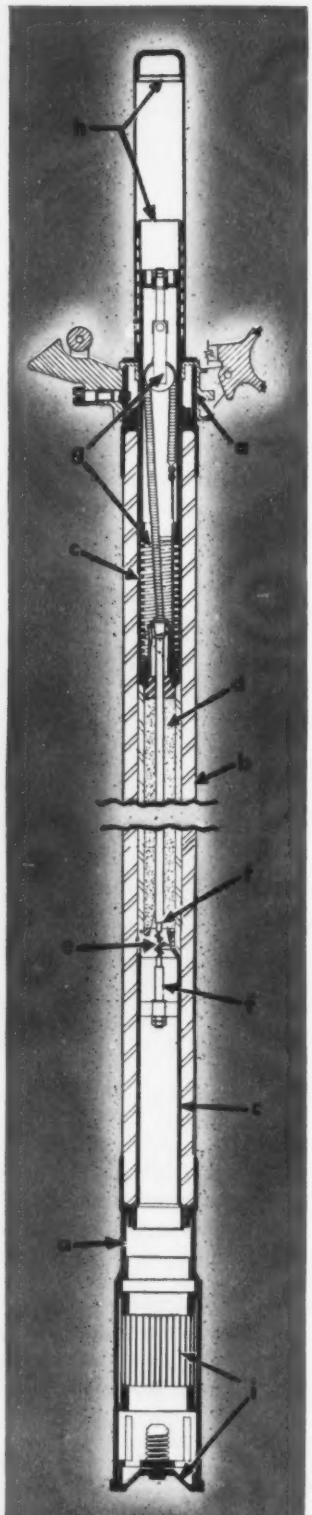
3. Where primary currents are of low value and low power factor—as in short circuits on the secondary of transformers.

4. Where the recovery voltage may be severe—as when primary fuses may have to clear secondary faults—particularly difficult where transformer banks operate with ungrounded primary neutral.

Full coverage protection also includes: (5) permanently accurate, reliable time-current characteristics and effective, prompt arc extinction, for coordinated isolation of faults and minimum system disturbance, and (6) electrical and mechanical characteristics which remain essentially unaffected by *corona*, weather, or atmospheric conditions over years of service.

The SMD Power Fuse has already had extensive laboratory and field tests, together with experience of a number of operations under service conditions. In field tests at 230,000 volts, short circuit values of 1,800,000 and 2,300,000 kva have been successfully interrupted in 3½ and 2½ cycles respectively.

It will benefit you to have full information on this remarkable development in power fuses. Ask for new Catalog Section 260 . . . NOW!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JANUARY, 1948 Vol. 100, No 1

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

GRADE LABELING OF EMPLOYEES CAN BACKFIRE

Kimball Jack

Washington Water Power Co., Spokane, Wash.

THE question has been asked, why at this time are so many utilities pounding the drums about "job evaluation"? Some people think grade labeling of employees will go the way of aptitude tests which boomed for a brief period after the First World War. They suspect that job evaluation is overrated. It must be admitted that considerable impetus to job evaluation occurred when the War Labor Board and the Salary Stabilization Unit of the Treasury Department required a grade listing of jobs (rate, range and salary schedule) from business and industry. Many executives will recall the necessity of submitting individual studies to the boards prior to grants for wage increases. Still further impetus came with postwar trends toward a more serious effort to solve employee problems.

That there exists an element of soundness in the theory of equal pay for equal work no one will deny. Attention to the whole salary problem has been needed for a long time. Many companies have no definite program of wage and salary administration. The early factory system permitted marked miserliness in hiring employees. In other instances employees were paid too generously without regard for production. Sex and age have been penalized. Labor arbitrators shook weary heads at the supervisor's ignorance of work performed under vague job titles. A survey in one company showed 33% of all employees resentful of how wages and salaries were handled.

Not Easy Sailing

Job evaluation, accordingly, takes its bow, seeking to determine the value, or relative value, of each job in the company, and the fixing of a fair wage for that job. As an ideal it is most worthy. Achievement, however, is not as easy as that. Job evaluation is no downhill ride on a toboggan. It is a most serious and difficult undertaking.

It may not be known that experts disagree, some vehemently, regarding the final effectiveness of a valuation program; that five authorities using identical tools will arrive at five different answers, a most strange science indeed; that despite the pleasant sound of the term "job" evaluation, no instance has ever come to light in which the inescapable synthesis of work and worker have been separated (we wonder why so much attention is heaped on the job and so little on the job holder); that correlation between responsibility and wages may show a negative relationship sufficiently wide (–.22) to discourage the most hopeful statistician; that employees caught on a down curve of living standards and who sense personal stagnation, may "beef" beyond the limits of executive endurance. Indeed, job evaluation is not easy sailing.

It is the intangibles that need double-checking before a company pushes from shore into the more or less troublesome job evaluation waters. For example, *companies starting job evaluation will have a tendency to superficially skim over the first chapter in "personnel management," catching the blurry notion of valuation, when the entire volume should be thoroughly studied and digested.* Job evaluation calls not only for painstaking, comprehensive thought, endless detail over many months, plus serious attitude, but some little knowledge of humans as well. "If only we could start today," say members of the reviewing board after job evaluation is finished, realizing that the voice of experience is lost to them. Difficulties had not been foreseen; the problem had not been thought through.

The matter of objectives will also need attention. What does management expect its organization to accomplish—efficiency, improved human relations, or what? How will job evaluation help promote such objectives? Surely it must seem impractical to give dollar value to such factors as "resourcefulness" or "mental effort" until it is agreed how these elements contribute to the simple problem of successfully staying in business. Surely an isolated factory in the wilderness requiring high production will not stress the same factors needed by a utility that is socially harassed, and the employees of which have no measurable output.

Job Description

Again, the attempt to describe each job may be most difficult. Here's what usually happens. The actual duties of a job currently performed are mixed and sweetened with the more ideal duties when a super job holder can be hired. This hodgepodge of "now-it-is, and now-it-isn't" invariably invites the convincing talker to put his best foot forward. Each job mole he describes as a mountain deserving more and more gravy, while the more conservative man loses money by comparison. Such terms as "responsibility," "contacts," and "effort" can be stretched like elastic in most organizations. Committee action is expected to prevent this inflation of the job description, yet there is no way of letting hot air out of an ideal. Committee members frequently know too little about the other fellow's job to argue successfully.

Another almost insurmountable problem of job evaluation is an inability to clearly define terms. No two people have identical conception of the meaning of such words as "supervision received" or "responsibility." To make

matters worse, no one attempts to define meanings. Consequently, the evaluation workers build fine mental anthills based on individual imagry and experience. It is no wonder that five experts will arrive at five different answers to the same problem.

Job X Is Worth Blank Dollars

Still again, a company entering job evaluation needs some drug, or hypnotism, or something at hand to make analyst and committee workers objective. Preconceived ideas as to the worth of a job, or an individual invariably crawl like ants into the honey. Prejudice and partiality regarding work and the worker filter through despite the super ego's watchful eye. The employees we like we treat well, and we can't help it. Incantation of such phrases as "oh, but this is about the job, not the man," does not change facts. After all, it is little more difficult to transfer love and hate through evaluation symbols than it was to favor an employee by an overt act before the system was introduced.

Assume, however, that job evaluation is accurately and fairly completed. Let the evaluation committee step forth and say, "We, the jury, declare that 'Job X' is worth blank dollars"—what then? Will management, executive officers and supervisors accept the verdict? Is there likelihood that traditional prerogatives will take the helm to slightly raise this salary and lower that one until everyone "appears" to be in line? If a committee is set up to create a climate of trust and fairness, and then someone in authority dissolves that committee and exercises personal judgment, what will happen to employee trust and sense of fairness?

Again, recalling the thousands of man-hours required in evaluation, is the company willing to maintain through organization changes its system of job evaluation, knowing that each new duty added or subtracted from a job leads to another specification, another session of the evaluating committee, another change in publications? The task is sizable.

Ability Can't Be Grade Labeled

Finally, and this is most serious, what can be done to achieve better final results from this array of factors, degrees, blocks and values? Comes now the stock answer, "that's up to the supervisor." And we are handed the textbook which clearly states that the sole purpose of job evaluation is to "divide the pay roll" so that jobs are paid for according to their relative difficulties—a most negative and unproductive aspect.

Job evaluation which received so many thousand hours of attention is about jobs, not people or results. Consequently, a nest is made for some employee to sit on, and the nest is worth so many dollars, because it says so on the box. Even though a rooster happens to climb on the nest and sit for 15 years, drawing the stipulated salary, job evaluation, this major personnel activity, turns a cold shoulder. In fact, with only about 15% of employees considered superior workers, job evaluation may even go so far as to raise a large percentage of unproductive, eggless crowing hens to a higher salary level. That condition is indeed irony.

Nevertheless, job evaluation is here to stay. The evils of bygone wage systems far outweigh the inaccuracies of job evaluation sincerely handled. If job evaluation is given to a competent personnel department, representing both management and labor, much good will come. It is only hoped, in the name of effectiveness, that industry walks into its program with both eyes open. Otherwise, employee distrust and employee resentment may easily outweigh benefits for years to come. Always in the minds of some, there will lurk the suspicion that if executives assembled twice each year to review the entire salary situation, would job evaluation be necessary.

Counter Proposal

A. Lloyd Hagerman
Public Service of Colorado, Idaho Springs

THIS ice barrier between a proposing public and a too proper utility, the cabinet maker's dream, this massive oak from the King's pantry, this carryover from the stage coach era, even to Scrooge and Marlowe, thankfully is disappearing—the counter in a public utility office. Back in the swinging lamp age it was an effort even for a man in a beaver hat to consumate his transactions through the traditional French Quarter grill work that encased every counter top. Delicate females seldom braved this business atmosphere.

But today women are actually paying light bills, as well as attention to business. Office personnel has pepped up, service is "anticipated," but ye olde counter is still there.

Why does Mrs. Jones have to stand up like a sailor on short shore leave to pay her bill across a barrier which coldly separates a kindly personage from a well-meaning corporation with honest intentions? Likely Mrs. Jones is short. She can't see above lunch time on a tall cashier, let alone over the oak furniture that was mid-Victorian when Edison was a telegrapher. So she pushes her little old light bill through the wicket and places her bet. Back comes her receipt stacked with four pennies and an 1897 quarter.

She never did see the pretty gals and the efficient office. She didn't meet anybody, just saw through bars the top half of a hungry change maker. She couldn't sit for a moment and take the strain off her girdle. She just had to stand. At home you don't talk to your neighbor through the screen, you invite her in, courtesy and such like. When she shops for a hat she has no chance to snag her nylons on sales resistance. She is seated, graciously, if you please, she is made comfortable and she likes it whether she likes the hat or not.

How can Mrs. Jones (she is 85% of the traffic in the conventional utility office) be made to feel more comfortable while she spend her money for that intangible commodity, utility service? How can her feelings toward the local company, good as they are, be improved? What can be done to modernize that friendly contact?

Out goes the counter, that no-man's-land between her and company. Desks take their place. The middle drawer is redesigned as a cash till. An inviting and comfortable chair is placed in front. After the first shock Mrs. Jones adjusts herself to the pleasant surprise, the chair is handy, the attractive cashier makes her at ease. It is nice to sit for a moment while a duplicate bill is prepared (she forgot to bring it) from a rubber tired portable ledger stand.

She pays, picks up easily her pennies and 1897 quarter, is refreshed and goes out with some real news. "Why, the light company has become human at last. They act like you are really welcome. Their office looks better too, more room, friendlier."

Don't ever put that counter back, unless you want to hire new help, though, it means so much both ways.

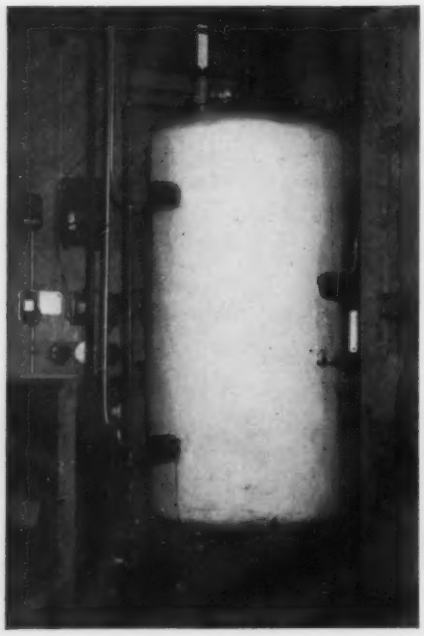
It works, pays big dividends in about everything, and the only thing against it is, the cost is negligible.

SAGGING-IN BY RADIO SAVES TIME

USE of two-way radio in place of linemen stationed on towers to relay arm signals is effecting a time saving of 50% for Pacific Gas & Electric Co. in sagging-in transmission conductors. In making the usual 3-mile, 21-tower pull, past practice required 12 linemen stationed on about every other tower to relay arm signals. Three linemen were required in addition to sight-in for correct sag. With radio, the 12 linemen are released for other work. Time for a pull has been cut from four hours to two hours.

Three two-way FM sets are used; one on the truck making the pull; one in the foreman's car, and one in a service car at the start of the pull. Driver of the service car is a licensed operator. Besides the saving in time, radio eliminates all lost motion and provides a nicety of control that obsoletes time-honored methods of the past. If anything happens during a pull, it takes only a matter of minutes for the foreman to locate the trouble, whereas, formerly it would often take half an hour running back and forth to find out what was the matter.

Radio equipment is standard two-way FM with 15-watt transmitters operating on a frequency of 153.59 mc, furnished by the F. M. Link Co. The new technique of stringing was worked out by R. A. Ransdall, engineer of line construction, and R. L. Brinton, radio engineer for PG and E.



Demand-controlled radiant house heating installations are supplied hot water by storage tank like the above 250-gal. unit using three 6-kw. Wesix insert elements. Right—a typical pipe layout for concrete slab floor on ground

Demand-Controlled Radiant House Heating

Because of great interest in the demand-control possibilities of radiant house heating using electrically heated water circulated in pipes, Electrical West presents the accompanying article. Collaboration in its preparation was sought from two prominent electric heating engineers, R. W. Shoemaker, national authority on radiant heating, and J. C. Beckett, chief engineer for the Wesix Electric Heater Co. The article points out the many advantages of this type of heating and sounds a note of warning against the poorly engineered jobs that would retard development of this fundamentally sound system.

BASIC soundness and growing receptiveness of radiant electric house heating using hot water storage directs attention to the interesting possibilities of demand-controlled or off-peak electric heating. A number of warm water radiant heating installations on the West Coast are using electrically heated water from a large domestic-type storage tank and circulated in pipes in the floor. Inherent characteristics of this type of heating appear to be ideal for the development of demand-controlled storage heating.

Energy consumption may be higher for this system than for unit heaters but the possibility of demand-controlled or off-peak rate development around a cent or less would make the operating cost attractive. Only complaint of the many installations now operating has been high bills. In every case of conspicuously high bills, the real problem has been traced to poor engineering and inadequate house insulation. Many jobs have been successful and competitive on present rate schedules, but these installations received greater care in construction to insure minimum heat loss from the building.

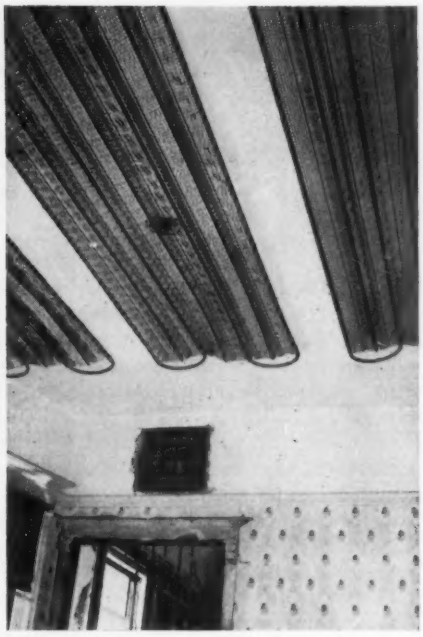
In this type of heating system the heating plant itself must be designed in accordance with the best practices of radiant or panel heating. Pipes in the floor or ceiling must be properly patterned to insure uniform temperature on the surface. Heat requirements may be determined from the mean minimum temperature given in the Degree-Day Handbook without regard to occasional colder days. That is to say, heating capacity must be sufficient for any 24-hour period where there is ample storage to take care of unusual minimums.

Tank temperature should normally not exceed 107°F. unless the heating equipment is specifically built for higher operating temperatures. It is recommended that all soldered joints be made up using hard solder (silver) where water temperature may exceed 150°. The usual tank size will range between 66 and 220 gal. depending upon the heat requirements.

In no case should the domestic hot water service be combined with the house heating system. In a few cases where this was done results were unsatisfactory.

Standard controls are necessary, such as proper thermostatic devices, modulating valves, circulating pumps, and pressure reducing valves.

The hot water tank is of conventional double-element design with a maximum of 5 kw. per element with additional elements if required located between the upper and lower units. Each element is controlled by its own individual thermostat. This design will insure a modulating load characteristic with good diversity.



Where the panel heat comes from the ceiling, a sheet of aluminum foil insulation and furring strips to hold the copper tubing are installed. At right, tubing and wire lath are satisfactory for remodeling an existing house or building

Basic Characteristics

1. The basic characteristics of radiant heating make it particularly suitable for demand-controlled or off-peak electric heating.

2. The system lends itself ideally to 24-hour operation. This provides load characteristics which particularly appeal to the utilities.

3. Thermal storage is easily provided.

4. Over heating or under heating is minimized by full house insulation.

5. Hot water storage provides quicker pick-up when needed than by the use of an instantaneous heater.

Fits Requirements

Requirements of demand-controlled or off-peak electric house heating seem to fit these characteristics perfectly. These are:

1. High thermal storage. Electrical energy must be consumed the instant it is generated. This fact causes load peaks. Demand-controlled electric heating means that heat energy must be stored in quantity.

2. Longest power system off-peak period is at night after 8 p.m. This is also the period of greatest heat loss from the house. Hence, greatest heat input requirements come during the nighttime valley of the power system load curve. Likewise it is the period of lowest ambient temperatures, allowing maximum transformer overloading; nor is low voltage at such a time of serious importance to the remainder of the system.

3. On a B.t.u. basis, electric energy costs much more than most other fuels. It should not be wasted. Therefore, the house must be insulated thoroughly to minimize loss of heat, particularly over night, and to provide high thermal storage in the house itself.

4. Demand-controlled electric water heating is already well established. Standard well-insulated domestic electric water heaters are available at low cost and are easily located anywhere in the house with a minimum of space requirement.

Insulation Important

Operating cost of electric heating is a function of the electric rate and the heat loss of the house. For this reason proper insulation against excessive heat loss is imperative. This cannot be considered a weakness of electric heating because every dollar spent on house insulation means a better home with longer life and greater comfort. Greater comfort is the main feature of radiant heating and electric heating. Combined they are a major attraction for the home owner. To be successful a house built for radiant electric heating either in the floor or the ceiling must meet the following requirements:

1. If concrete floor, the ground under the floor must be assumed to be damp and a good conductor of heat. A full waterproof membrane must separate the house from this damp ground. There must be no possibility of moisture being sealed up in the heat insulating barrier between house and ground. The finished floor must be heat insulated from the perimeter foundation.

2. The outside walls must be thoroughly heat insulated with high-quality moistureproof building paper and full thickness (3½ in.) loose fill or bat material which will not pack from vibration or age. Concrete block and brick veneer houses must be similarly insulated.

3. Ceilings must have a minimum of 4 in. and preferably 6 in. of high-quality insulating material. This insulation must cover the entire ceiling area as far out as the junction of joists and rafters. Decorative beam ceilings must be constructed to include 4 in. of insulation.

4. Weatherstripping of outside doors and loose-fitting windows is essential. Generally, fixed windows are preferred as far as practical. Interior decoration should include full covering draperies if possible. Boxed out windows with flush mounted draperies are ideal. Double glazing should be considered on all uncovered windows.

Radiant heating is not the lowest in first cost of house-heating systems. But electrically heated circulating hot water radiant heating appears to be the least expensive, satisfactory system from the standpoint of both the user and the utility. The essential requirements for successful application here outlined should serve to direct development along soundly engineered lines. If not early discredited by poorly engineered jobs, radiant heating with electrically heated water can provide a system of electric house heating with very good load characteristics.

100 PER CENT IS 100 PER CENT— There's No Diversity

Edwin Fleischmann
Consulting Engineer, Palo Alta, California

HOW long can the utility industry continue to add incremental loads without changing its philosophy of distribution system planning and engineering? Power companies began with only a lighting load. They found that this required a large investment in machinery and lines, which was idle all day, and only operated at full capacity in the hours of darkness. There followed campaigns for industrial load, for off-peak uses of all kinds to fill the valleys in the lighting load curves.

In the home, there has been a similar development. First lighting, then irons which, because they were used in the daytime, were supposed to employ idle equipment. And so they did on most systems, although it was reported that a few small systems had Tuesday morning peaks of considerable severity. Iron wattages were high.

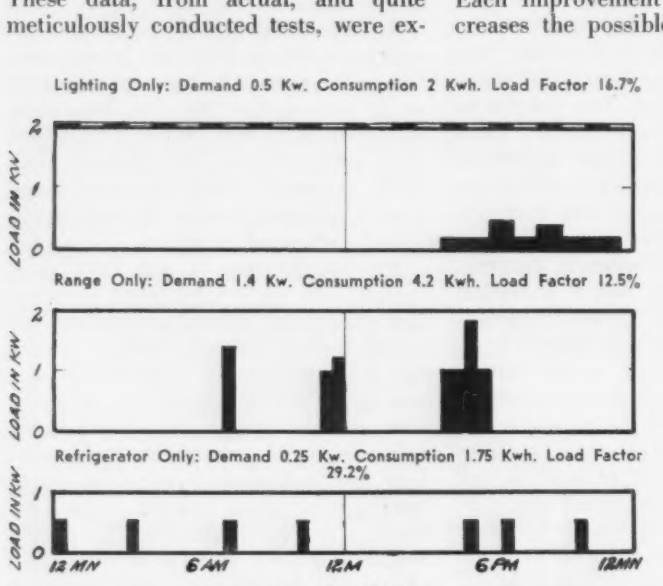
As each appliance came on the lines, an effort was made to show what it would do to the customers' annual kilowatt-hour consumption. Electric ranges, refrigerators, and water heaters were big users, and revenue was boosted thereby. The literature is replete with studies showing how low a diversified demand may be expected from ten or twenty or fifty ranges, or a similar number of water heaters or refrigerators. Recently, the same technique has been applied to house-heating load. These data, from actual, and quite meticulously conducted tests, were extrapolated to indicate the effect of a thousand ranges, or a thousand water heaters. No one has seriously questioned the validity of such results, and it is not intended to do so here.

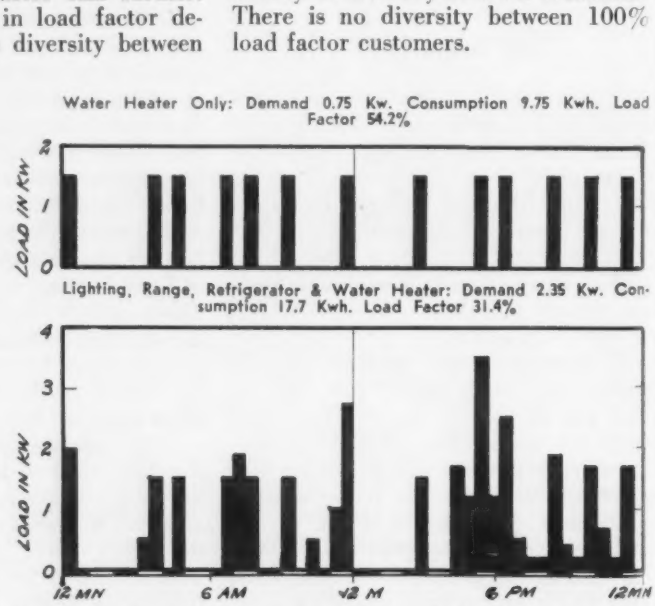
However, distribution engineers at the present time are worrying about capacity to carry the load, which is still growing. An important basic fact about load characteristics seems to have escaped attention. While there is diversity between the times when each individual customer among a thousand uses his range, or his water heater, the important diversity is that between several appliances within each household. Improvement in the individual customer's load factor materially lessens the possibility of diversity between his load and that of his neighbor. This situation taxes distribution capacity.

The electric range is a peak-making device. A number of users are, therefore, unlikely to demand the full capacity of their ranges at exactly the same moment. So we say that there is high diversity among range customers. But what other devices do these homes have? Add a high-load-factor refrigerator, and the customer's own peak will rise only slightly. His load factor will improve considerably. An off-peak water heater, or even an uncontrolled water heater with a thermostat, will add little to the range peak. But it will increase the load factor still further. Each improvement in load factor decreases the possible diversity between one user's peak and that of all other customers.

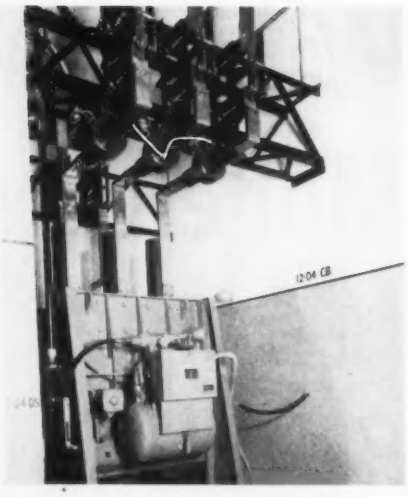
The greater overloads and higher use-factors developed, perforce, during the war, may now have to be reappraised in the light of higher-load-factor operation, especially in residential areas. Distribution engineers will have to plan for this more continuous operation, as well as for the larger loads which will inevitably follow the greater availability of electrical appliances. They must design systems to care for the loads which customers will put on the lines in an electrical age such as we have not seen before. More appliances and new appliances of different characteristics of use will increase the demand on distribution plant. Not to be left out of account are electric house heating and air conditioning, both of which are seriously engaging the attention of the industry.

It is most important to recognize that the utilities cannot continue indefinitely to sell incremental kilowatt-hours, on the assumption that there is sufficient diversity to justify such sales. An aggressive eagerness to "get the business," and a failure to appreciate that distribution systems were built for demands and uses of an earlier day, may stem from a neglect of the fundamental fact that the higher the load factor, the lower is the possibility of diversity between customers. There is no diversity between 100% load factor customers.


Lighting Only: Demand 0.5 Kw. Consumption 2 Kwh. Load Factor 16.7%
Range Only: Demand 1.4 Kw. Consumption 4.2 Kwh. Load Factor 12.5%
Refrigerator Only: Demand 0.25 Kw. Consumption 1.75 Kwh. Load Factor 29.2%
LOAD IN KW
12 MN
6 AM
12 M
6 PM
12 MN


Water Heater Only: Demand 0.75 Kw. Consumption 9.75 Kwh. Load Factor 54.2%
Lighting, Range, Refrigerator & Water Heater: Demand 2.35 Kw. Consumption 17.7 Kwh. Load Factor 31.4%
LOAD IN KW
12 MN
6 AM
12 M
6 PM
12 MN

These charts are illustrative only and merely serve to show how the addition of electric appliances and water heating improves the daily consumption and load factor of a residence. Average one hour demands given in each case



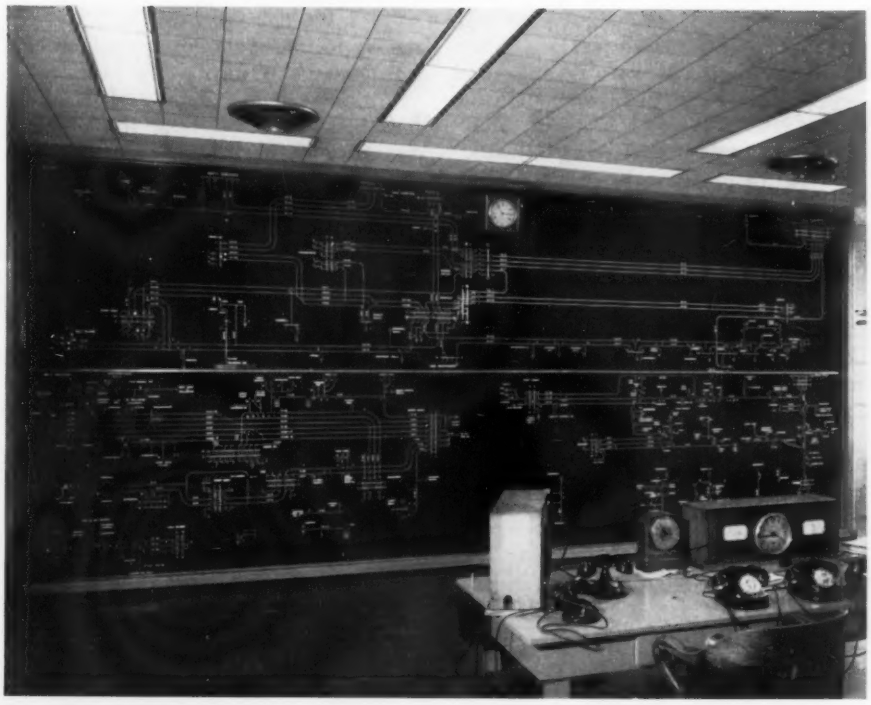
Installation of 52 air-blast breakers in new Murrin sub of B.C. Electric Railway is said to be largest on continent

NEW CANADIAN SUB USES AIR BREAKERS

INSTALLATION of 52 air-blast circuit breakers, three 25,000-kva. three-phase transformers, supervisory control and telemetering are outstanding features of the recently completed Murrin substation of B. C. Electric Railway. Said to be the largest indoor switching and transformer station in Canada, the $2,000,000 plant will be key station in a system of five to be built in a thirty-mile sub-transmission ring around Greater Vancouver during the next eighteen months. The system was designed to provide a framework large enough to serve the metropolitan area when population has tripled to about 1,300,000 people. All five stations of the ring will be interconnected with double 60-kv. circuits to minimize the possibility of interruptions to service.

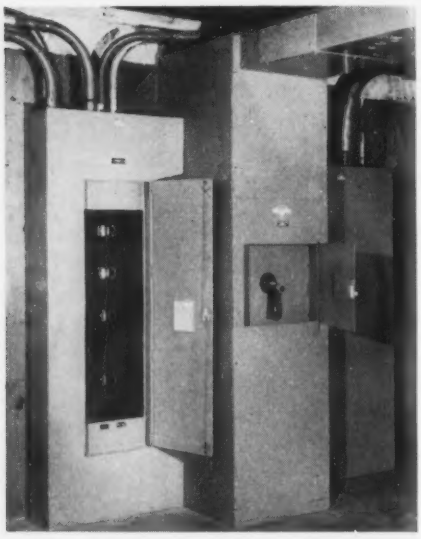
Power at 60 kv. is transformed by the bank of three forced-air, forced-oil-cooled, three-phase units (with provision for a fourth unit) to supply downtown load at 12 and 4 kv., and single-phase street lighting at 2.4 kv. Breakers on the 12- and 4-kv. circuits are pneumatically operated air-blast type shown, built by English Electric Co. Installation of 52 units is said to be largest on the continent, with provision for adding ten more.

Supervisory and telemeter equipment allow operation of station from load-control center located in main office of B. C. Electric. This load-control center provides centralized control of the system based on telemetered indications of load on generating stations and major substations. The large diagram board shown indicates conditions on the system and aids the operator in controlling the system during emergency as well as routine operation.



Generating stations, manually operated substations and trouble crews will be linked by FM radio, power line carrier current and telephone channels. The short-wave radio will also serve as a trouble signal system and means of remote control. Alarms from unattended remote stations will be flashed to the control center via the FM link; by flashing back a coded signal the operator can operate a series of relays to open or close circuits and clear the trouble.

Wiring Modernization In Large Building



Main distribution center in basement serves basement, 1-2-3 floors. After 90-ft. overhead run from main switchgear, 3,000-amp. enclosed bus is vertical

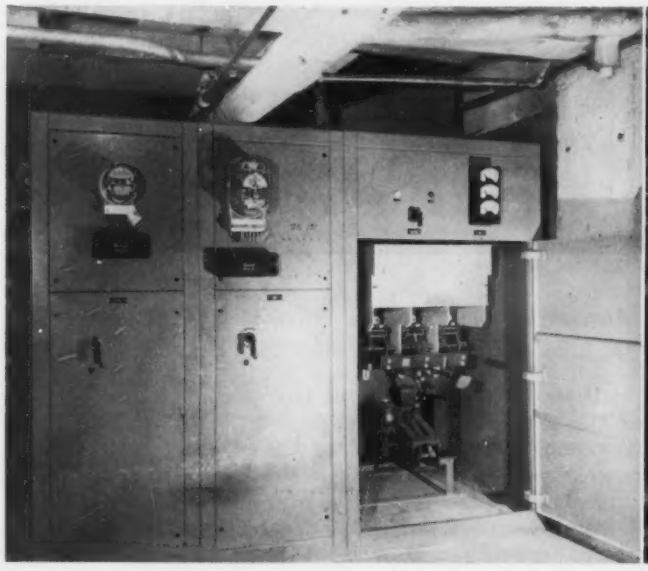
O. O. Rands
Consulting Engineer
San Francisco

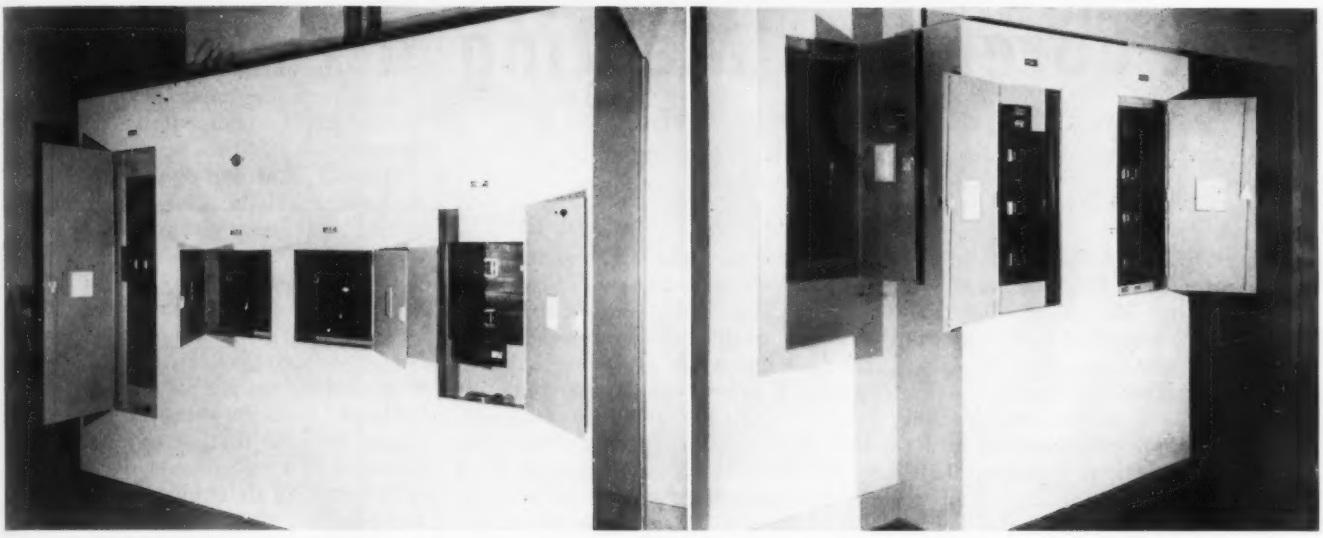
IN congested metropolitan city areas in which the electrical load density has increased beyond the capacity of existing radial distribution systems, utilities are converting or replacing old radial feeders with extensive network systems. With this conversion are associated various problems including an important, and sometimes overlooked, consideration of the interrupting capacity of equipment protecting the connected loads.

In the case of the Veterans Administration Bldg. located at 49 Fourth St., San Francisco, the above conversion problems occurred coincident with reoccupancy of the building. An investigation indicated that a complete rewiring job was required. This eleven-story building was built in 1926 primarily to house apparel manufacturing businesses and during the ensuing 21 years numerous changes and additions had been made to both the building feeders and wiring system. All lighting was supplied from various single-phase, three-wire services and all power except the d-c elevators was served with 220-volt three-phase.

As shown in one of the accompanying photographs all feeders were individually metered and controlled from a main distribution room located in the basement. Main building feeders and all sub-feeders were protected by standard type safety switches. All lighting panels were of the old marble slab type with surface mounted snap switches and plug fuses protecting the

Main metal-clad switchgear with 3,000-amp. air circuit breaker, provides adequate interrupting capacity for rewired Veterans Administration building, San Francisco. Power company engineers estimated building service from 120/208-volt network might be subject to short-circuit inrush currents of 75,000 amp. Middle compartment houses emergency circuit reactance coil, connected ahead of main breaker to reduce short-circuit inrush to 25,000 amp., provide energy for operation of main breaker. Previously all feeders were individually metered and controlled from a main distribution room in the basement, part of which is shown below. Main building feeders and all sub-feeders were "protected" by standard type safety switches, power circuits were 220 volts, three phase before modernization





Main distribution centers on sixth floor (left) and eleventh floor (right). Metal-clad unit on left serves all power requirements on 4-5-6-7-8 floors. It also mounts a 50,000-amp. air circuit breaker for short-circuit protection from the 3,000-amp. bus coming up from the basement, and a second breaker to protect the 1,000-amp. bus which continues up to the eleventh floor of the building. Unit on right supplies 9-10-11 floors, the penthouse and elevators

individual circuits.

From a study of the new requirements of the building it was determined that approximately 1,000 kva. would be needed to handle the load including new a-c elevators. The utility company indicated that this capacity could only be supplied from their 120-208-volt network system and it was necessary to provide them with sufficient space in which to install a new substation in the basement of the building. It was learned from the utility company's engineers that the new building service as connected into their network might be subjected to short circuit inrush currents of as much as 75,000 amp.

The new main building switchgear as shown consists of two metal-clad compartments. The first compartment houses a 3,000 amp. air circuit breaker of 75,000 r.m.s. ampere interrupting rating. This breaker is electrically operated and the panel is provided with indicating lights and a triplex ammeter. In the second compartment is installed the emergency circuit reactance coil which is connected ahead of the main breaker. This coil reduces the short-circuit inrush current to 25,000 amp. and provides energy to operate the main breaker as well as to supply all emergency circuits such as hallways, stairs, elevators, etc. This panel also includes the main X-ray breaker and the power company's metering equipment.

From the main switchgear, 3,000-amp. enclosed bus extends across the ceiling of the basement a distance of about 90 ft. to the outside wall of an elevator shaft located near the center of the building. From here the 3,000-amp. bus extends vertically up to the sixth floor at which point the bus capacity is reduced to 1,000 amp. and continued on up to the eleventh floor. Since these high-current, low-voltage circuits present considerable voltage drop difficulties, all buses are of interlaced construction to reduce reactance losses.

Main distribution centers are located in the basement, on the sixth and on the eleventh floors. Each distribution center is protected from the bus by a 50,000-amp. interrupting capacity main breaker. Besides the five main distribution panels used, there are 42 lighting panels and six special panels as required for X-ray, kitchen, boiler room, shop, etc. All panels are made up of quick-make, quick-break air-circuit breakers. Relighting of the building was accomplished almost entirely by the use of shielded commercial-type fluorescent fixtures. Lighting intensities between 20 and 30 ft-candles were provided in most areas. However, special lighting was required in such locations as over dental chairs, over operating tables and in X-ray and photographic rooms.

The electrical system was designed primarily by the author in collaboration with Mr. C. McCauley, electrical engineer for the Branch Twelve office of the Veterans' Administration. Electrical rehabilitation and installation was done by the Severin Electric Co. and all switchgear, panels and bus runs were supplied by the Trumbull Electric Co.

Typical room lighted by shielded commercial-type fluorescent fixtures. Intensities of 20-30 f-c were provided

First Foreman's Meeting

Contractor's Supervisory Staff Share Their Knowledge

FOREMEN are the front line of management. This statement was made by Charles A. Langlais, San Francisco electrical contractor, at the recent national convention of the National Electrical Contractors Assn. in San Francisco, at a session devoted to trying to improve production in the electrical contracting industry. Langlais then went on to describe the foremen's meetings held in his office once a month and the benefits that had come both to the foremen themselves and to the contracting business as a result of them.

These foremen's meetings, said Langlais, are strictly business. There is no social aspect to them. They are held in his office on the foremen's own time, after hours. Their basis is mutual self interest.

At the first meeting the foremen were somewhat suspicious of the purpose behind them. Langlais presented the point of view expressed in the following text to these men. He then opened up the discussion to the excessive costs of tools, their loss on the job. Journeymen, he told them, were supposed, according to the union agreement, to furnish certain tools and were not doing so. The men told Langlais some of the tools supplied by the management "weren't so hot." Langlais explained that he had felt it was no use buying expensive tools if no one took care of them.

From this discussion back and forth a better understanding of the entire tool problem was reached by both Langlais and his foremen, and the tool situation was practically solved from then on.

After this several other meetings were held. One foreman after another was put in charge of the meeting and was asked to prepare a paper or outline of a subject to be discussed. Later these papers were mimeographed and copies of them distributed to each man.

Among the problems discussed were the cost of deliveries, the tool situation, the relationship of the foremen to the company's switchboard department, the handling of men, handling of plans and details of construction. It soon became apparent to the foremen that what today was another foreman's problem tomorrow might well be theirs.

In order to assist other contractors to hold similar foremen's meetings and thus benefit the entire contracting industry and improve productivity, Langlais has made available to ELECTRICAL WEST the papers presented at several of these foremen's meetings. The first, which follows, was that which Langlais himself presented at the first meeting. Next month will be published one by a foreman on the sizing up of plans. Another will follow on handling of men.

"Foremen are the front line of management," Langlais told the convention. "Take all of your management group in and try to better it and you will solve a lot of your production problems."

Following is the first meeting talk:

Why We Meet

We have recently had considerable trouble on some of our jobs, particularly out of town jobs, with contract and extras. Foremen and journeymen have difficulty in keeping them separate. In fact, they seem unable to do so.

I would like to point out to you that, if the records are not kept straight, all of your efforts elsewhere are nullified. If you do extra work and charge it to the contract, then your contract does not come out well financially. After all, you are selected to be a foreman because we think you can make the job pay.

We want to perform our contracts honestly. We want to be honest with the customer, and we want to be honest with ourselves. If we treat ourselves honestly, we will treat our customer honestly. You are the representative of the firm, on the job. Your care and attention to this increases your value as a foreman immeasurably.

Remember always that the electrical contracting industry belongs to us. By us, I mean the contractors and the journeymen. If we take care of our industry, our industry will take care of us. Remember that as a representative of this firm you are a business man taking care of a piece of business. Intelligent handling of that piece of business will make the difference between a profit and a loss.

If we don't operate at a profit then we have no excuse for being in business. The industry would be better off if those who just squeeze by, or who just make a living at the business, were eliminated from the business because they make it very difficult for the more intelligent businesses to operate.

Honesty and fairness with respect to your relations with the customer merits, and gets, the customer's respect for you.

It has been called to our attention that some of our men have been drunk on the job. We will not tolerate drunkenness, or drinking, on the job. What a man does on his own time is his business. What he does, or is able to do, on the time that we pay for is our business. If a man cannot do his work on account of drinking too much the night before, then we have no further use for him.

AW Committee

PCEA's adequate wiring committee, again headed by Elbert Kramer, Westinghouse Electric Supply, is carrying out its plan to enlist the active support of distributors and contractors in selling adequate wiring to the home owner and builder. Delegating the job of dealing directly with the home owner to the utilities, the committee plans to confine its efforts to developing a greater wiring consciousness among those who supply the materials. The wholesaler members of the committee are taking care to see that their own organizations are constantly reminded of the need for adequate wiring, while the manufacturer members are carrying the story to other distributors and to contractors and retailers. Thus, it is hoped, the public will be constantly reminded of the wisdom in adequate wiring through contacts with utilities and sources of wiring supplies. The committee is composed of the following:

E. H. Galchutt, Graybar Electric Co.; Karl G. Kempf, Thomas & Betts; Walter A. Matzinger, Westinghouse Electric Supply; J. F. Hrabatin, Gough Industries; J. A. Bissett, Hollywood Wholesale Electric Co.; C. H. Thrane, General Electric Supply Corp.; A. B. Smedley, A. B. Smedley Co.; J. W. Barry, Trumbull Electric Co.

A. M. McMillan, Harvey Hubbell Co.; P. E. Golsan Jr., Pacific Electro-Sales Co.; G. F. Wismer, electrical inspector, city of Santa Monica; C. V. Soper, Southern California Edison Co.; Walter E. Vaughan Jr., California Electric Power Co.; E. W. Meiese, San Diego Gas & Electric Co.; Robert Thallen, Pacific Gas and Electric Co.

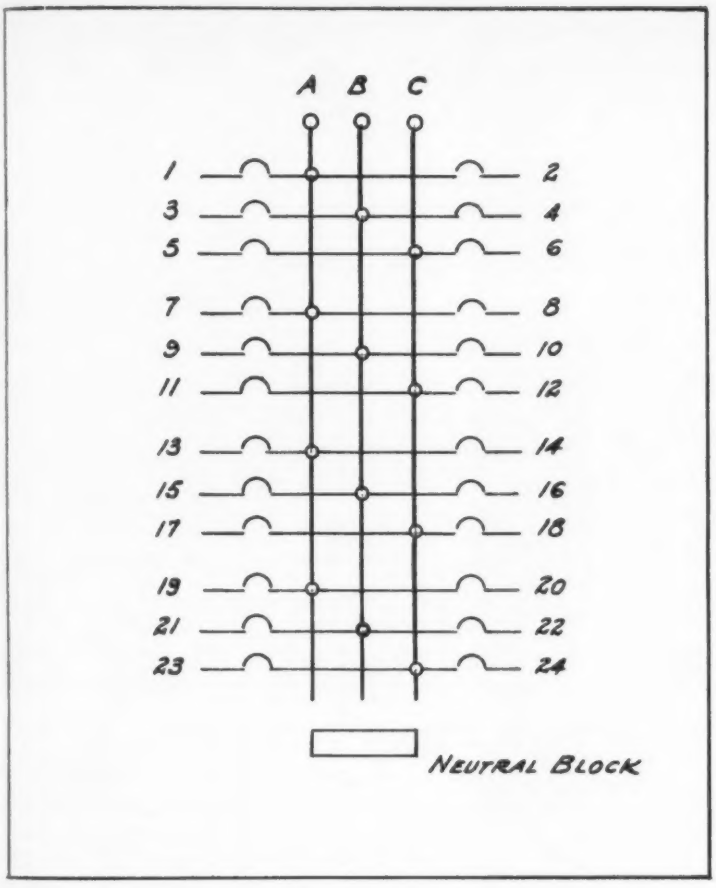


Fig. 1

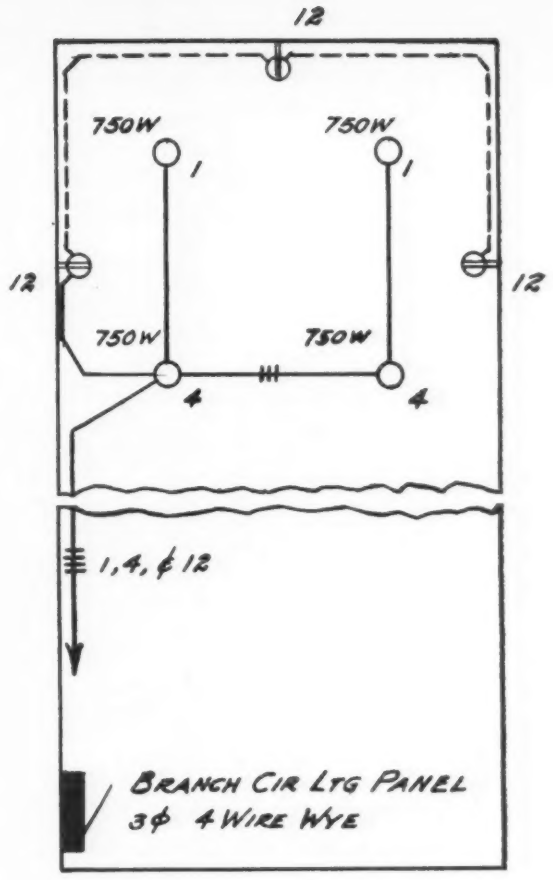


Fig. 2

Careful Planning Pays Off in Wiring Layout

Scott Beamer

CARE with which a wiring job is circuited can have a direct effect on cost. Number of wires in a conduit, size of conduit, outlet boxes, condulets and pipe straps, and man hours per 100 feet of conduit installed are directly dependent on careful planning on the drafting board.

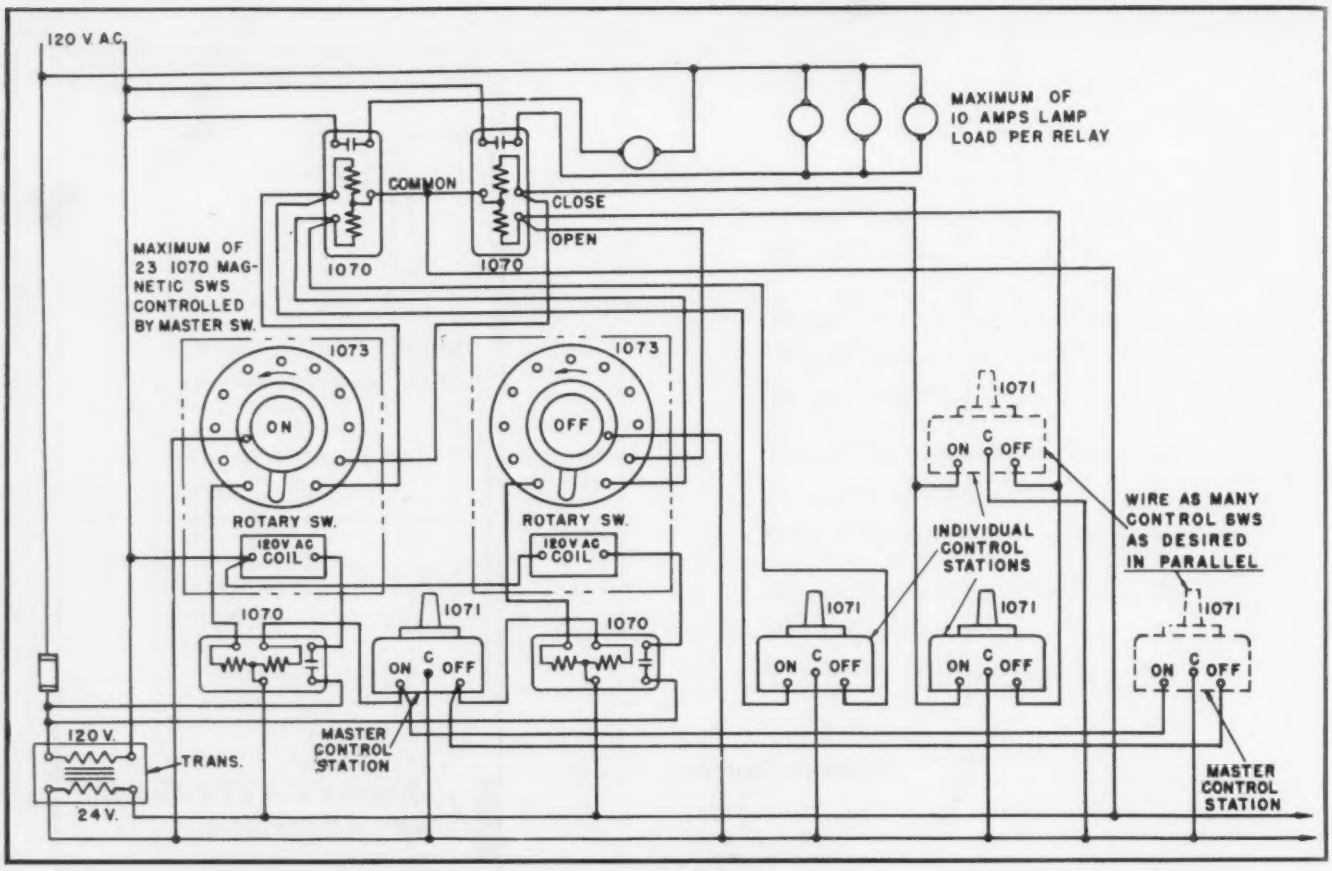
This is particularly true of the common single-phase branch-circuit for lighting, convenience outlets and small power requirements, which makes up a large percentage of all electrical work. One type of 3-phase 4-wire "wye" branch circuit panel is shown in the accompanying illustration (Fig. 1) as an example of bussing arrangements for such circuits. It is common practice to use circuits at the top of the panel for lighting exclusively—in this case circuits 1-12. Lighting spares are located immediately below at 13-14. Circuits 15-22 would be commonly used for convenience receptacles, clocks, alarms, etc., and 23-24 left as spares.

Right here is where it pays to sit back and think. Let us take another example (as in Fig. 2) where lighting circuits 1 and 4 are located in the same general area along with receptacle circuit 12. They are on phases A, B, and C respectively. A single conduit run can pick up all of these circuits at a nearby outlet and carry them home some 50 ft. or more with just four wires. If adequate thought were not given the matter, six wires might have been used for lighting circuits 1, 4, and receptacle circuit 12. Again if three additional wires were used for circuits 14 and 16 the home run would have nine wires and require special junction boxes, 1¼-in. conduit and all 1¼-in. fittings. By combining circuits of the proper phases in a common location in the building, regardless of position on the panel, the number of wires was reduced from nine to seven, conduit size brought down to one inch, over 100 ft. of wire saved and regular fittings used instead of special ones. Wiring for any particular 3-phase panel can be determined easily by an electrician. Phase positions are identified by black blue and red terminals, and the three circuit group is made up by combining the three colors with the white neutral.

Similarly on single-phase 3-wire panels any combination of an *odd* and even numbered circuit can be put on three wires instead of the four as are required if both circuits are on one phase. Where three wires are used instead of four, ½-in. conduit may replace ¾-in., etc.

Most engineers and contractors are fully aware of how to make up these circuits with the fewest possible conductors, but it is always important to double-check the physical arrangement of circuits bearing this in mind.

One precaution should be particularly observed in using this system of connections—it is important that connections be made to the proper terminals on the neutral bar. Combination of 20-amp. and 15-amp. circuits, which will often occur, will offer no difficulty if this is done.



Typical wiring diagram of low-voltage control system for both master control and individual control of residence electrical circuits. Control voltage is provided by a 120/24-volt transformer. One side of the secondary is common to the center point of the single-pole, double-throw, automatic center-return toggle switch. Other side of the secondary is connected to the common of a special mechanically latched relay incorporating two 24-volt coils —one to open, one to close its 120-volt contacts. Since the relay coil is energized only during operation, it can be controlled from any one of several switches connected in multiple. Operation of the motor-driven, rotary-type switch is controlled through the same type of switch and relay from any desired number of control points. Thus any number of rooms can be lighted quickly and easily from a single control point, for convenience or for an emergency

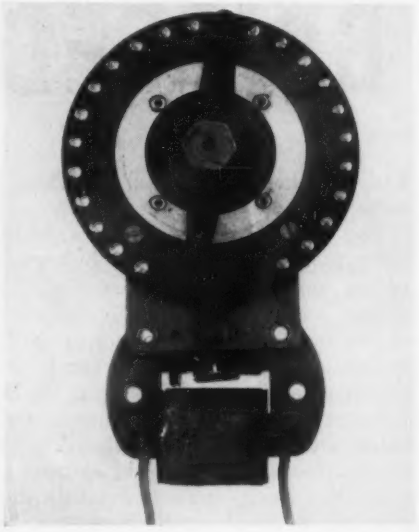
LOW-VOLTAGE SWITCHING ARRIVES

So much interest has been aroused by the idea of low-voltage relay control of lighting circuits in a residence that the electrical industry has long awaited an easily installed, dependable packaged system. There have been demonstration installations which received publicity, but up to the present time no completely developed system had been placed on the market.

From Los Angeles there now comes news of the introduction of such a low-voltage control system—"Saflex," designed and manufactured by Square D Co. First installation of this system, which conforms with adequate wiring programs and is Underwriters' Laboratories approved, was made in a seven-room residence wired by Barnett Electric Co. Included in the installation are provisions for multiple control of lighting in each room, plus garage and yard lighting. Nine separate outlets, including floodlights, comprise this exterior lighting system. They provide a path of light from garage to main hall controllable from any one of four separate switches.

Self-contained transformer to supply control power for new low-voltage residence lighting control. C. E. Barnett, L. A. electrical contractor, connects Thermador unit on original installation

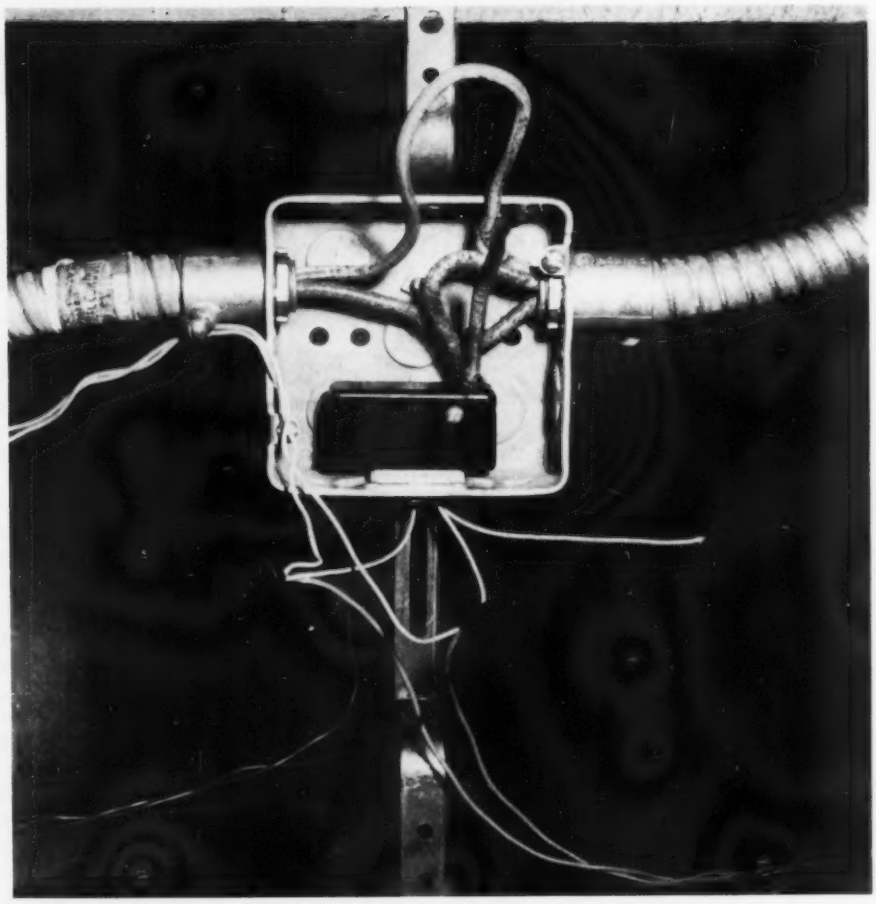
Basic units of the system are a 50-va. 24-volt transformer, a control switch, and a special relay. The switch is a single-pole, double-throw, automatic center return, lever type, with



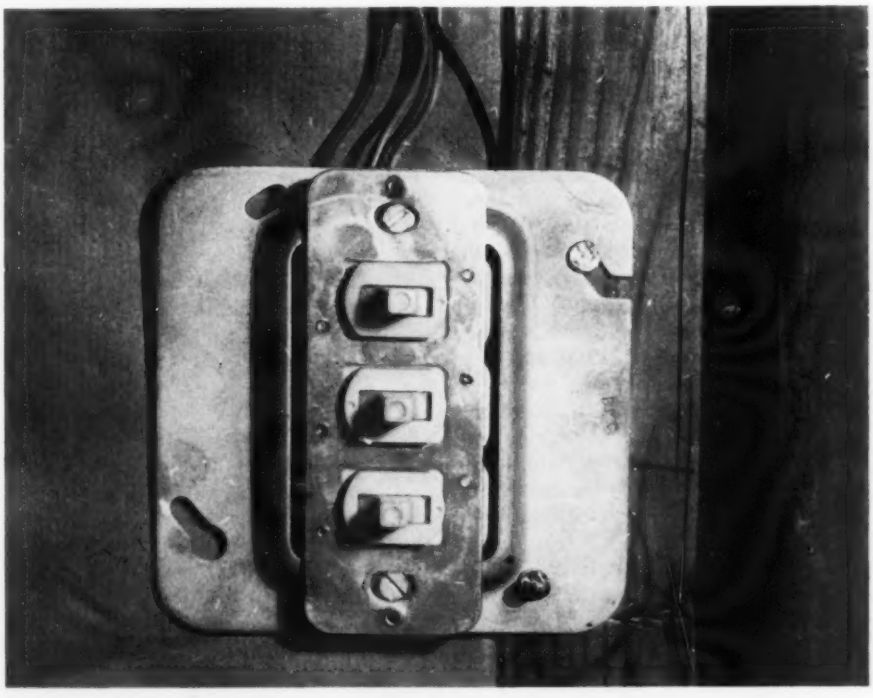
Master control contactor is 120-volt a-c motor driven, is controlled by the same type relay used for individual stations. With it any number of rooms may be lighted from one control point

its common connected to one side of the transformer secondary. Three color-coded conductors run to the small mechanically latched electrically actuated relay. The relay is usually mounted in the fixture outlet box or in the receptacle box of the 120-volt circuit which it controls. Common point on the relay (which has both close and open coils) is connected to the other secondary terminal of the transformer. Since the control circuits are de-energized except when opening or closing a relay, any desired number of switches may be connected in parallel. This permits control of a given circuit from several points—for instance the lights in a room from each entrance—without expensive three- or four-way switches. Switches may be ganged at a multiple control point as shown and are designed to take a standard switch plate with no additional fitting. The system is readily adaptable to master control to allow any number of rooms to be lighted from a single control point in any one room.

Use of the low-voltage limited input transformer for control circuits eliminates the switch loop from outlet box to control point of the conventional system. Complete isolation of the low-voltage control circuits insures greater safety in operation. A roughed-in installation and typical wiring diagram are shown in the illustrations.



Above—Special relay mounted in standard outlet box showing low-voltage control wiring for room with three entrances. Each pair of conductors is an off and on lead from each entrance switch. All are paralleled (see diagram) to allow operation from any switch at any time, without use of more complicated and expensive conventional multiple switches. Black wire at far right is common from 24-volt transformer secondary. Greater ease of installation and saving of material through use of the low-voltage color-coded control conductors are said to justify use of switches at all room entrances that are desired



Roughed-in switch installation at a multiple-control point. Single-pole, double-throw, automatic center-return switches are designed for a standard switch plate and may be ganged as shown

MORE IES PAPERS BRIEFED

Additional papers from the IES national convention at New Orleans than were reported upon last month were presented at the Illuminating Engineering Society conference of the South Pacific Coast region, at Los Angeles in November. (See December Electrical West, p. 70-74.) Digests of those papers are presented here as a guide to those who may wish to give them a complete reading when they appear in the IES Illuminating Engineering.

Washing Floodlights

If the output of floodlights and streetlights is diminished after a period of service, how effective is cleaning to increase the light output? This question prefaced the paper on *Maintenance of Outdoor Lighting Equipment* by Francis T. Williams, Westinghouse Electric Corp., Cleveland, and read to the Los Angeles meeting by Robert Harris of the same company. The paper gives the results of tests on various kinds of street lighting and flood lighting equipment and includes photometric curves of the difference in light output as initially installed, after complete cleaning, and after being removed from installation for cleaning. It covers baseball park installations, minor league parks, softball fields, parking lots, and street lighting installations.

Conclusions reached are that there are two types of reflector depreciation, temporary and permanent. The temporary depreciation is due to accumulation of grime and dirt on the luminaire which is readily removable and has not caused a deterioration of the reflecting surface.

Permanent depreciation is due to accumulation of foreign deposits which cannot be removed or have caused an attack of the oxide coating, or corrosion of the underlying aluminum. Emphasis is made that permanent depreciation in the case of all aluminum units results from use of trisodium phosphate solutions for cleaning or of strong acid solutions. Each of them destroys the high reflectivity of the Alzak finish. Special cleaning solutions should be used for aluminum finishes. The trisodium phosphates are good for cleaning glassware only.

The paper concludes with recommendations as to maintenance schedules.

Is It A Profession

Whether illuminating engineering can be considered a profession, was discussed by R. L. Biesele Jr., of Southern Methodist University, Dallas, at the Los Angeles meeting.

First he sought to analyze what the requirements of a professional engineer would be, quoting a recent Supreme Court definition of a profession as "a vocation involving relations to the affairs of others and of such a nature as to require for its proper conduct an equipment of learning or skill, or both, and to warrant the community in making restrictions in respect to its exercise."

Professor Biesele then made a distinction between the illuminating engineer and the lighting specialist, saying there is a need and a place in the society for both, but there is a difference and it would appear in the best interests of the society to make the distinction.

The illuminating engineer should be defined as a man who has had a college course leading to a degree in electrical or mechanical engineering, with some years of experience in the practice of illuminating engineering. Others who could not qualify under the preceding definition would be classed as lighting specialists.

More than mere definitions however, he called for a professional awareness and a high standard of ethics. He explained the Texas Engineering Registration Act and then pointed out that regardless of definitions, laws or codes, illuminating engineering as a profession will be whatever illuminating engineers choose to make it. "The public will judge it as it deserves to be judged, and the process of judgment is already under way."

Reflected Glare

That the glare reflected from surfaces such as desk-tops and papers is harmful by reducing visibility of the task and in wasting of human energy in unproductive effort, was demonstrated in the paper by William G. Darley, illuminating engineer, and read at the Los Angeles meeting by Ted Shepherd, Los Angeles Department of Water & Power.

For any given task the reflected glare is a function of the brightness of the source, the candlepower of that source area contributing to the effect at any one point (depending upon the degree of gloss on the surface) and the foot-candles on the task. Darley then recites the results of some experiments to measure the reflected glare from various types of light sources in the ceiling, ceiling areas brightly illuminated by indirect lighting, etc. In each case he makes subjective conclusions as to the rivalry that exists for the attention of the observer between the voluntary demands for fixation on the task and the involuntary demand to fixate the images of the bright sources.

An interesting point is made that the worst condition arises when the task is not a plane surface and the images of the glare source for the two eyes are distinctly different, making impossible a satisfactory binocular fixation on either the glare source or the object. Solutions offered are lower source brightness, lower candlepower from contributing source area, increasing task brightness, and improved task characteristics.

Brightness and Decoration

Sometimes the fundamentals of good decoration agree and sometimes disagree with brightness ratio recommendations of the IES. W. H. Kahler and J. A. Meacham, Westinghouse Electric Corp., Cleveland, in a paper read at the Los Angeles meeting by Charles R. Long, Westinghouse Lamp Department, seek to correlate the viewpoints of the decorator and those of the illuminating engineer.

"On certain occasions," say the authors, "the lighting engineers' expectations of an ideal installation are hampered by a decorative scheme that does not conform with the recommended principles of illuminating engineering. Likewise the decorator may feel that it is impossible to obtain his desired effect if he is limited by low brightness ratios."

Consideration is given first to the so-called ideal conditions for lighting of an office, with low contrast between the brightnesses of various surfaces and equipment in the room. Then the decorative viewpoint is discussed. Con-

trast is said to be an important tool for the decorator. Contrast in color and brightness give pattern and form and thus establish the character of design. Another factor that has psychological value is that people instinctively prefer to be conscious of the limits of things. Shadow contrasts are needed to define the form and outline of the room. Therefore there seems to be a limit beyond which further reduction of brightness ratios can be accomplished without sacrifice of interest and balance.

A great many interesting points are made which the practicing illuminating engineer might well consider in handling color in relation to his work.

Conclusions reached are that brightness ratio should be kept low but not at unity; that large areas of weak color may have approximately the same power as a small area of strong color; that it is well to borrow the knowledge and experience of skilled decorators in working out in advance a series of carefully studied color combinations giving full consideration to brightness. In all cases the selection requires careful cooperation between the lighting engineer and decorator, with the strong probability that some compromise will be needed on the part of both, the authors conclude.

Higher Frequencies

One thing the war developed was the use of frequencies of around 400 cycles and above in aircraft in order to minimize the weight and improve the efficiency of electrical equipment. The question whether higher frequencies would be advantageous in fluorescent lighting has excited the interest of engineers, and John H. Campbell, General Electric Co., Cleveland, presented the results of his experiments along that line. Kirk Reid also summarized his paper at the Los Angeles meeting.

One of the most pressing problems in connection with large-scale use of higher frequency for fluorescent lighting would be the high cost and comparatively low efficiency of available conversion equipment. Improvements in 60-cycle operation of fluorescent lamp and equipments have likewise lessened the necessity for it.

The author then goes into considerable detail as to the testing of 40-watt fluorescent lamps in a range of frequencies up to 2,500 cycles, with three types of lamp ballasts — inductive, capacitance, and resistance. The results at various frequencies are tabulated. It is estimated that lamp life at high frequencies, using various methods of ballasting the arc, would show very little deviation from 60-cycle operation. Consideration was also given to circuiting and to frequency conversion equipment. It is interesting in passing that the greatest gain in overall efficiency of any combination tested was with a 72-in. slim fluorescent lamp.

In concluding, Campbell suggested that where direct current is the only available power source, and conversion to alternating current has to be made anyway for some purposes, higher frequency could be used instead of the usual 60-cycle in order to take advantage of higher load efficiency and lighter-weight control equipment in fluorescent lighting. His further conclusions are as follows:

"Lamp characteristics show a gain in efficiency with increase in frequency, the extent of the gain dependent on the type of lamp and ballast. Ballasts become smaller and lighter in weight as the frequency increases regardless of the type of ballast considered. Instant starting of fluorescent lamps can be accomplished with simple circuits containing fewer and lighter-weight components. Stroboscopic effect is minimized at the higher frequencies thus allowing the use of single-lamp ballasts for applications where two-lamp split-phase ballasts are required at lower frequencies. While some gain in line power factor can be realized through the design of lower voltage single-lamp ballasts, it is desirable to use the two-lamp split-phase ballast at higher frequencies if power factor close to unity is needed.

"Frequencies in the range of 300 to 600 cycles permit the use of lightweight capacitance-type ballasts which also provide the maximum over-all efficiency.

Reflector Lamps

Those who make use of reflector spot and flood-lamps will find useful *Application Data for Downlighting Equipment* in the paper by that name, presented at the IES convention by Lorin C. Brown and Priscilla Presbrey, Westinghouse Electric Corp., Lamp Division. This was read at the Los Angeles meeting by Walter Alden of the same company.

While not claiming to conclusive results, tests were made on a large number of six types of reflector lamps of both 150- and 300-watt spots and floods, and the data assembled in a number of tables which should be useful to the designing engineer.

"As was to be expected," say the authors, "considerable variation was found among individual lamps of the same type, and even among a single carton of lamps of the same manufacturer and the same date of manufacture. Efficiency is affected not only by the slight variations in coils, glass thickness, and density of frosting common to the manufacture of all filament lamps, but also by the quality of the internal reflecting surface and by slight variations in filament position.

Curves Needed

Reminding that there is perhaps too much emphasis on brightness engineering and a glorification of the foot-lambert, with some suspicion of intolerance for old-fashioned foot-candle engineering, C. E. Weitz and C. L. Amick, General Electric Co., Cleveland, made a case for candlepower distribution curves for luminaries. Kirk M. Reid of the same company read this paper at the Los Angeles meeting. While the candlepower distribution curve was popular some 25 or 30 years ago, the use of light meters has reduced its scientific flavor but nevertheless the data as to distribution are still highly important.

The authors discuss fixture efficiency and utilization factors as important elements in designing a lighting installation. With the use of fluorescent equipment much of this has been ignored, they say. "The disturbing aspect to the lamp manufacturer is the diligence and expense employed in the research laboratory to achieve a few per cent increase in lamp efficiency—and it is distressing to see this efficiency gain often dissipated by wasteful application design through an attitude of indifference. Some fluorescent general lighting equipments show output as low as 35%, as against comparable equipment emitting 60 to 65%. In such cases the power bill is continuously substituting for intelligent engineering design."

Supplying of "thumb-nail illustrations" of distribution curves by manufacturers, the authors feel, is not sufficient. They maintain that manufacturers of fixtures should publish distribution curve data and utilization factors for their specific unit. "Fluorescent luminaires may have quite a variation in distribution as measured lengthwise and crosswise, particularly specular parabolic troughs with small diameter lamps where such design is calculated to give a quite narrow crosswise distribution."

Difference in mounting likewise affects the characteristics of distribution. Some fixtures vary greatly when mounted against the ceiling as compared to when suspended at different heights in the room.

ELECTRICAL WEST

If We Stay in Business

WITH generating capacity sold out beyond the safe margin for peaks and new capacity slow in being constructed, some managements are inclined to wonder whether any much needed money should be spent in sales promotion or general commercial activity, until that new generating capacity is available. With the floor of costs rising below a fixed kilowatt-hour selling price to squeeze operations toward need for rate increases, managements may well be looking for some means to ease the pressure, and the advertising and sales departments may seem temporarily the least needed.

But is it wise to weaken the front line troops at a time like this? If the electric power industry never had competition before, it has it now. LP gas is riding this crisis in electric power to intrench itself as deeply as the storage tank it sells the customer. It will be the harder to blast it out. Every customer it takes over for the cooking and water heating load costs electric utilities more to serve for lights alone.

And there are other and very potent reasons why electric utility companies must remain strongly commercial and promotional, even if it strains them to serve the business they stir up. The rest of the industry depends upon them for market development and stimulation, for leadership and such things as sales training—things that individual small businesses cannot themselves afford. Failure to receive this backing from the power serving utility, are they to look for it elsewhere—from the politician, perhaps? No, as business enterprises electric utilities must *stay in business.*

This was said so truly and so penetratingly at the recent PCEA conference by George Hawley of Southern California Edison in these words:

"No trickery has conspired to raise demand so as to embarrass utilities at a time when generating equipment is difficult to obtain . . . This is the result of twenty-five years of constant hammering at the American consciousness of the merits of electrification; in the home, on the farm and in the factory. This is the culmination of our broad attempt to identify increasing use of electricity with a rising standard of living. This has been our job since the inception of the industry. It is still our job in 1948.

"If we intend to stay in business, we cannot escape being the foremost exponents of the virtues of electrified living, electrified farming and electrified manufacturing. This is the essential justification for being in business at all. Without minimizing the enormity of the technical difficulties involved in keeping pace with these demands, we simply may not, with impunity, by word or act or the omission of either, jeopardize the esteem in which these services are held, as evidenced by our customers' purchases of them."

How Would Workers Vote?

HOW would utility workers react to a provision in the Taft-Hartley law which would forbid them to strike? We have frequently wondered if their appreciation of the important public service aspects of their jobs might or might not outweigh their allegiance to a so-called labor "cause." Our curiosity is heightened by study of a survey conducted by the Public Opinion Research Corp. and published by *Look* magazine. The inconsistencies revealed in this study might serve as a cue to the drafting of an anti-strike utility law; certainly they indicate the possibility for some educational activities which, incidentally, are now permissible under the Taft-Hartley act.

For instance, over half of all of the workers interviewed and two-thirds of those who were union members believe that Congress should not have passed the law. If the numbers who had no opinion on the subject are omitted, then the ratio of opposition rises even higher. Yet irrational as it may seem, when opinions were asked on each of the ten provisions of the law, a majority of the workers approved. Most popular plank was that requiring unions to make regular financial statements; least popular was that forbidding unions to make contributions to political campaigns. And only one provision failed to win approval when only union members were considered. This was the section outlawing the closed shop.

EDITORIAL VIEWS

Reason for this inconsistency is stated admirably by Claude Robinson, president of the Opinion Research Corp. He says, "what is the solution to this contradiction? Perhaps it is to be found in one more simple figure. When our interviewers asked the workers for specific features of the bill, 54%—more than half—were unable to name correctly a single specific provision. Only a minority could cite *any* provision, and few could visualize in concrete terms how the law would affect them personally. What people don't understand, they fear. Ignorance goes a long way toward explaining the prevailing suspicion and distrust."

This last statement contains the key to many of the electrical industry's problems—an anti-strike law; electric rates; potential power shortages, or what have you?

There'll Always be Steam

EVEN here in the Far West, where electric energy is predominantly supplied from hydro sources, the cost of fuel is causing considerable speculation as to the ultimate fuel-hydro power ratio for the region. There are many complicating factors that impinge upon the fuel-hydro relationship. Rising costs affect both types of plant construction—hydro more than fuel, perhaps. Fuel resources and their conservation; future technological developments; changing efficiencies; freight rates—these are variables that will have a bearing on future developments.

Fuel oil has more than doubled in price since 1940. Natural gas has a higher public usage than the generation of electric energy. Coal is available in large supply. However, fuel oil prices must rise 50% before coal will be competitive in the major power markets along the Pacific Coast. Freight rates are tending to increase and thus place coal in an even less favorable position. On the other hand efficiencies of steam-electric plants are increasing—engineers predict that a 10% improvement is in prospect. Technologically the coal people are talking in terms of ultimately piping their fuel to market as either a liquid or a gas.

In resolving these complexities, one can reasonably predict that steam plants will continue to serve sizable blocks of load in this region in the future just as they have in the past. As a dependable reserve against the exigencies that affect hydro, it is essential to the electric power supply.

A Blot on Christmas

BEFORE another Christmas rolls around the lamp manufacturers would do well to make changes in their Christmas-tree lamp allocations between string manufacturers and the regular lamp outlets to prevent another shameful "black market" exploitation of these miniature lamps. What happened this year again is no credit to the electrical industry, least of all to the manufacturers who try to maintain decent sales policies. They lost complete control of their own product—and reputation.

IT would be comforting, in the face of the daily attacks upon our system, and in the face of the predictions that swell from within the country as well as from without that time is about to blow the whistle on the institution of private enterprise, to feel that we have only to stop our ears to the clamor and fight it out along the old lines. Unfortunately this is not quite true. Like any fighter of experience we must do a certain amount of rolling with the punches and adapt our program of attack to prevailing conditions. But this is nothing new. The American capitalistic system has never been blind nor foolhardy nor reactionary in the long run or it would have fallen long ago. Its adaptability on defense has always matched its boldness on attack. We are possessed of a working, practical, economic philosophy, proved by time and results. We are opposed now, and in the past we have been opposed by, economic and social theorists who—to be kind—have never won a major skirmish. Let us not ignore our opponents, or take them lightly, but also let us not lose confidence in our own methods.—Charles E. Wilson, president, General Electric Co.

"OUR JOB IN 1948"

TREMENDOUS changes in the West since 1940, great increases in population have brought new problems to the electrical industry, said H. H. "Kelley" Courtright, president, Pacific Coast Electrical Assn., as he opened the fall conference of the association at Fresno, Dec. 4 and 5.

Because so many of us have been close to the problem, we have not appreciated the size of it, Courtright commented. In California alone there has been a three million population increase, as much as the total population of some states. This has put a tremendous load upon the electrical industry and all of its branches. The industry has done a fine job, but what of the future?

With this challenge he said the program of the meeting was built around the question "Our job in 1948." The speakers for the morning general session were to present points of view of this job in 1948 representing the manufacturers, wholesalers, contractors, retailers, and public utilities. Due to illness, some of the speakers had been unable to be present and some substitutions from the original program were also made.

A digest of the principal speakers talks follows. Total registration for the two-day conference crossed the 500 line on Friday afternoon. At the closing dinner an honorary membership in the PCEA was presented to Dave Harris, retired, former member of the board of directors and vice-president of General Electric Supply Corp. Victor Hartley, managing director, was likewise presented a gift from the International Association of Electrical Leagues after his two years as president of that group.

For the Contractors

Lou H. Spott

Spott Electric, Oakland

THE contractor's job is a continuation of the job he has customarily done in the past, with special emphasis on aligning his organization to be in a better position for a more competitive business year.

First he must use better selection in the training of his engineering sales personnel. The contractor is called on more and more in helping with the engineering of the work. There is more electronic and specialized equipment being used, and he must be familiar with it. Therefore he must do a better screening and selection job in the procuring of his organization.

Next he must be in a position to take advantage of both better installation methods and economies. This means that he must know of the existence of new materials, he must know their applications and where to use them to advantage.

Next he must endeavor to work in conjunction with manufacturers in the introduction and use of new and improved products. This means that he must be able to explain their advantages over other materials and equipment that have been used in the past.

He must work continuously with electrical inspection authorities on the modernization of electrical goods. We are still going by the codes that were enacted many years ago. Many inspectors are not familiar with new materials and techniques. It takes work on the part of the contractor to acquaint them with these developments. It means he must have a better knowledge of the product he is selling and be able to interpret them to the inspectors.

All in all he must improve his sales approach. This will come with a better knowledge of his products and a better engineering know-how.

One point touched upon is a very important one. Prior to the war elec-

Bragg Courtright

Meise Henderson

trical work on a construction job rarely exceeded 7% of the total job. Today 13c of the building dollar is not unusual for the electrical installation. This means we work with 6c more of every building dollar than we did before the war. Lighting, which was so necessary during the war, was raised to very much higher levels, exceeding anything we had before. Whereas we used to be satisfied with 10 and 15 ft.-candles, it is not unusual now to have 100 ft.-candles in ordinary lighting installations. Lighting is making the people electrically conscious and is carrying with it a demand for much more electrical work.

Finally the contractor must learn to watch trends and understand the problems of the business and increase his efforts to be the businessman that this new electrical era is demanding of him. He must increase his efforts and his service to his community.

For Manufacturers

Robert A. Neal
Westinghouse Electric Corp.

REMEMBER when we all wondered what in the world we were going to do with all the war-created kilowatts? They all *still* have jobs—and we're all busy creating more power generating equipment and putting it to work to try to keep generation a safe pace ahead of utilization. The electrical industry is still in the turbulent period of readjustment.

Our company recently completed a study of the expected power requirements for a ten-year period 1946-1955. During that period it is anticipated the sale of power will reach a level between 280 and 290 billion kwh. or 40% higher than the present rate, with industrial activity maintaining its present level. It has been historical that, to insure continuous service, public utilities have maintained a 30% safety factor. But today it has shrunk to an 8% factor, which means that every piece of equipment is being worked to its limit.

In the next two years they plan to install 10 million kilowatts of new generator capacity. This load is imposing some trying problems on the electrical manufacturer. But today Westinghouse is producing more than two and one-half times as many product units as in the year 1939—and I think our experience is typical of other manufacturers. These figures have no relation to price factors but comprise actual product units — more motors, transformers, generators, switchgear, meters —more of everything electrical.

All manufacturers have embarked on plant expansion programs to increase production facilities. Production on motors is two and one-half times the 1939 rate, on transformers two and one-quarter times, on lighting it is two and three-quarter times. These are only a few production examples but serve to illustrate how electrical manufacturers are expanding their facilities and their efforts to satisfy the demands of the industry.

It is our opinion that shipments have almost reached the peak necessary to take care of the ever-mounting backlog. All manufacturers have backlogs which amount approximately to about a year's total production. On some lines, however, things are much better. In fact on some products we are scratching for business. This must be true of other manufacturers.

You are familiar with the labor situation in 1946 that drastically cut into production schedules of electrical manufacturers. That situation has been greatly alleviated today. We are *pleased* with the improved productivity of our workers.

Electrical product prices have not risen in line with living costs or as much as most other durable goods prices. The index for all electrical goods including apparatus is about 30% above prewar prices. I see no immediate price increases on such lines as we manufacture. We are strong in the faith that prices should be held to as low a point as will show a reasonable profit with efficient production. Just the same, it must be realized that we are on a new level and that certain factors such as coal, steel, and labor costs, point to higher rather than lower levels.

Electrical manufacturers fully recognize that increased costs must be partially absorbed through production economies and they are bending every effort toward that end. They are adopting every means in design, engineering and manufacture to control costs to produce equipment that will lower maintenance and installation costs.

The current tremendous demand for electrical appliances has made the production of all manufacturers, vast as it has been, seem disappointingly small. But most of the established manufacturers, if our experience is typical, have equaled or exceeded their last prewar year's production figures. During the first nine months of 1947 our company produced a total of about a million and a half appliances of all kinds — 55% more than we produced in the same period of 1941. If the steel supply improves, naturally all appliance makers will increase their output. At the worst, and barring unforseen work stoppages, appliance manufacturers expect to equal their 1947 production figures in 1948 whether or not more steel becomes available.

I feel moreover that there is nothing wrong with the economic set-up that can't be cured by an honest day's work for a fair day's pay on the part of everyone everywhere. As an industry, we manufacturers accept our obligation and are determined to throw everything we have into the job. Like you, we have rolled up our sleeves. We are going to fill that order.

For the Wholesalers

L. E. Starkweather
L. J. Meyberg Co., Los Angeles

MOST of us are the sole representatives for important national lines in our respective trading areas, and as such are entirely responsible for the movement of our percentage of those factories' total output. If satisfactory relations are to be maintained, we as wholesalers must be geared to show top performance in a market which is constantly becoming more important from a national viewpoint.

Since the return of merchandise, we have all knowingly operated under fictitious conditions, which have led to the development of poor habits and selling practices. Many factors have developed which indicate troublesome times ahead. Production continues at an unheard of rate—inventories in wholesalers' hands are increasing—collections are more difficult—past dues are increasing—mark-downs and cut price sales are more in evidence—all of which are danger signals that must be recognized and prepared for.

One of the most encouraging signs in the retail appliance business is evidence that the mortality rate in this field has receded to its normal proportions of total retail failures.

Merchandise is arriving in unheard of quantities. We have talked for many months of pipe lines filling up. I wish to submit that they do not fill up—but rather clog up at the retail level, primarily due to inability of retail outlets to cope with the sale of increasing quantities of merchandise with inadequate and as yet untrained sales organizations. This I believe to be our major job and our number one obligation in 1948.

Retail salesmen require sound guidance from wholesale men. I feel that sales development at both the wholesale and retail levels ranks at the top of the list, and no product can move further than the sales push behind it. We hold many meetings within our own organization and the following pretty well covers the fundamentals dwelt on constantly:

1. Know your territory thoroughly and select dealers that will give you a pattern of distribution which will assure you of full performance from every market.
2. Have a sufficient number of dealers to do the job but few enough so that their market provides them with a fair return on their invested capital and effort.
3. See that every dealer selected reflects credit on your product and then be sure that he has the identification and facilities to enable him to fulfill his obligation.
4. Help him select and train a sales force and then suggest how the work of this sales group can best be organized to be most effective.
5. Help him develop store arrangement and displays. Assist him in working out advertising and sales programs.
6. Be constantly familiar with his fiscal affairs. Be alert to unbalanced overhead and bad inventories.
7. Know his competitors and your competition.
8. Today's dealer organization is never static and you will make mistakes in selection. When you are sure it is a mistake, don't live with it but correct it.
9. Constantly survey your market and keep yourself informed with changing trends and current conditions.
10. A wholesale representative is the spokesman for his company and his intelligent handling of dealer relations will either build or destroy good will.

We will need a thoroughly activated credit department. Our credit managers should have sufficient time to analyze and extend proper credit. They should act in an advisory capacity, particularly with new, inexperienced dealers—to see that their capital structure is protected—that their assets are not frozen by overpurchase of slow moving merchandise—and be a guide and help in matters pertaining to retail financing and dealer flooring, both of which will become increasingly important. The credit manager should carefully analyze the five important factors in credit extension, namely: character, capacity, capital, conditions, and insurance coverage.

Summarizing briefly our job in 1948 is composed merely of the primary fundamentals of business applying to sales and operation:

1. A thorough analysis of our market and changing market conditions.
2. Recognition of the responsibilities entailed in our growing Western section.
3. Inventory control that assures proper purchasing, prevents overstocks, and provides normal turnover.
4. Sales training of wholesale and retail salesmen to provide continued flow of our products to the consumer.
5. A smooth operating credit department that will keep our accounts receivable within proper bounds—and at the same time provide an advisory bureau for the guidance of our dealer organization.

For the Utilities

George N. Hawley
Southern California Edison

OUR job is to meet the unprecedented demands for the present and to preserve their growth in the future. On the West Coast this growth of demand and of population has been doubly potent. Each unit of that population demands an increasing amount of electricity both in its home and in its business.

To meet that problem Western utilities are feverishly engaged in procurement and installation of over 1¼ million horsepower of new electrical generating equipment both steam and hydro. We may be assured that the collective brains of the industry are bringing together all the necessary facilities for an early solution of the problem.

Why this great increase of individual consumption of electricity? This is no accident. This is no sudden development. It is the natural result of our past action. This is the product of the work and faith of the entire industry. This is the continuing objective of the whole electrical fraternity. This is the result of 25 years of constant hammering at the American consciousness on the merits of electrification, in the

home, on the farm, and in the factory. This is the culmination of our broad attempt to identify increasing use of electricity with a rising standard of living. This has been our job since the inception of the industry. It is still our job in 1948.

If we intend to stay in business, we cannot escape being the foremost exponents of the virtues of electrified living, electrified farming and electrified manufacturing. This is the essential justification for being in business at all. Without minimizing the enormity of the technical difficulties involved in keeping pace with these demands, we simply may not, with impunity, by word or act or omission of either, jeopardize the esteem in which these services are now held, as evidenced by our customers' purchases of them.

We are today reaping the benefits of ideas implanted in the minds of customers years ago. Over the years, only a minor portion of our efforts result in immediate action. The bulk of those efforts cumulate and find outlet in times like these. Then we are all greatly surprised at the "sudden" inrush of business. For this reason, we cannot turn public acceptance on and off like a faucet to suit the exigencies of the moment. We have but one choice: to foster and to perpetuate the idea of electrification in every legitimate field of application or give up the ghost.

Having thus set forth our basic philosophy as the champion of electrification in its every phase, let us examine the mechanisms by which such a policy is effectuated. Four cardinal points suggest themselves:

1. Our technical skill in developing and making available the constantly increasing amounts of electricity associated with a rising standard of living.
2. The completeness of our integration with the communities we serve.
3. The success of our collaboration with our colleagues within the industry —manufacturers, distributors, dealers and contractors.
4. The potency of our advertising and the effectiveness of our sales organizations.

These factors may largely be called the human elements of the equation. In surveying the job for 1948, no one in his right mind can fail to assign primary importance to the *people* who will carry out the task.

For these *people*, we have *plans* to be carried out in 1948. Plans for the further electrification of the home, of industry, of business and of agriculture. With respect to electrification of the home, we are now engaged in four major activities.

First, the coordination of dealers activities into a unified hard-hitting group of men on the very firing line of the business.

Secondly, we are engaged in an adequate wiring program designed both to insure our new customers against the bottlenecks of insufficient capacity and also to revamp existing dwellings so as to permit our customers to keep pace with their own rising standard of living.

Thirdly, we are engaged in the furthering of uniform electrical codes.

Fourthly, we are engaged in a program to bring about the modernization of the homemaking departments of the schools.

Utilities who are on their toes, will give full support to the Planned Lighting Program as sponsored by the Edison Electric Institute.

In the commercial field commercial cooking and commercial air conditioning deserve special mention. You are familiar with the heat pump which cools in summer and heats in winter. It is a development of great promise and it needs a good deal of field testing right now. Utilities are the proper agencies to procure such records and cooperate in this development.

In the rural field three subjects need attention:

1. Utilities have built thousands of miles of new rural lines. It is essential now that all factors in the industry—manufacturers, wholesalers, dealers and utilities—turn to and put forth a real effort to equip these rural customers with needed wiring and appliances.
2. Investigation and development of new uses of electricity on the farm is the main job of the Committee on Relation of Electricity to Agriculture.

Part of the credit for industrial expansion is due to the availability of electric power, but utilities have had more to do with bringing in new industries than is generally supposed. New factories mean more to us than so many horsepower of load and so many dollars of revenue. They represent job opportunities for our citizen-customers. They mean new capacity for producing wealth—the value added by manufacture. They mean increased stability of our regional economy. Industrial development is as much a part of a utility's job as is the hanging of a transformer or the reading of a meter.

In the area of costs and prices we have heard a good deal lately about the inescapable rises in electric power rates. It is not my intention to controvert these opinions, but rather to suggest the moves which the industry is making to minimize such price increases. It goes without saying that we shall resist price increases by every means at our command, and if they do become necessary, we shall minimize them to the greatest extent possible. Looking as far ahead as we can see now, price movements in the power field at the worst can have no serious effect on the economy of this region. Relatively speaking, with the price of everything also greatly increased, electric power has been moving to lower and lower levels. On our side, we have the growing advantages of mass production. This, in turn, depends upon mass consumption, and accounts for our concern with the consuming end of our business as well as the problems of supply.

Isms

Lane D. Webber
Southern California Edison

TREATED to a scintillating peppering of adjectives, figures of speech, and rhythmic phrases from Lane D. Webber, vice-president, Southern California Edison Co., the conference closed Friday noon at the luncheon, after hearing him tell of the "generation, transmission, and distribution of isms."

"Opportunity cannot exist without liberty, and liberty assures or guarantees opportunity — incentive, reward, promise that one may work when, where, as and at what he will, knowing that he may keep and accumulate his earnings—employing them in the expansion of his little enterprise until it becomes a tremendous source of goods, jobs and progress. Liberty, opportunity, incentive, security — self-made security." Webber declared that so long as that concept was recognized and respected, progress was constant. Where it was departed from by reformers or political experimenters who tinkered and tampered with the complicated controls of our system, the result was socialism, collectivism, or communism. How excess taxation can impoverish a people and drive them to socialism had been demonstrated elsewhere, he said. "Remember whenever and wherever the private resources of the people are exhausted, some form of socialism always results."

"Within our ability and capacity, we will meet any just obligations to suffering humanity and to deserving, needy nations, but there must be reciprocal obligations coming our way. Those expecting help must make every honest, human effort to help themselves —and not harm their benefactor."

And finally, "Let's accept the chal-

lenge of the 'isms': meeting socialism as a social cyst, collectivism as a mental twist, communism with a closed fist, till all recognize our right to exist, and isms and schisms explode with a 'pfffsst!' "

Administrative Services

IN five parallel groups, the Administrative Services Section, under Chairman G. M. Henderson, Coast Counties Gas & Electric Co., and Vice-Chairman J. K. Uhler, Southern California Edison, conducted its meetings largely as discussion groups with their prepared topics by speakers to initiate the discussion.

Personnel Group

A. J. Noia, PG and E, sponsor, C. H. Warner, General Electric Co., co-sponsor.

The Taft-Hartley bill as it affects the electrical industry was the topic for discussion on Thursday afternoon; testing and indocrination of employees occupied the Friday morning session.

In an hour and a half of a closed meeting, L. J. Nevraumont, PG and E, gave an excellent digest and analysis of the Taft-Hartley Act. He carried his hearers back to before Taft-Hartley, to the 1935 Wagner Act and gave the background and history that produced this changed labor law. He then reviewed various provisions of the act, giving their advantages and limitations in contrast to the Wagner Act as affecting the various interests involved, namely, management, employees, and unions. Labor has all the rights it had before the act was passed, he said, but it does make possible for employers to discuss working conditions with their employees, for an employee to vote on the question of union shop, for him to say whether he wants the check off of dues and for groups of employees to ask for decertification.

"We are engaged in serving the public," said Nevraumont, "We have tremendous responsibilities. We have proved that we can give good service. One of the things we want is the opportunity to give *continuous* service. We do not want strikes on our properties. As an industry, it is yet to be determined as to whether or not we have any more protection from strikes than we had before. If you have a contract that says 'no strikes' you will have some protection against work stoppages, but otherwise the union can

Hawley Spott

authorize a strike under the law if you do not meet their demands."

Guy Wadsworth, vice-president, Southern California Gas Co., and originator of a personnel temperament testing system, discussed the value of testing employees for better organization. He maintained that the only purpose for centralizing hiring is to improve the quality of selection. Under traditional procedures, this has not always been accomplished. He showed the things that can happen under the personal interview technique and showed improvements possible by the testing method, concluding that testing can improve vastly the type of selection.

The interview technique, he held, is quite unreliable and can give opposite results because it so largely depends on popular but entirely irrelevant or fallacious concepts of value. The effectiveness of the examination technique, however, can be proved. It is not infallible but by comparison with the usual interview technique, which scarcely increases the bare chance of successful selection, there is a better opportunity to correlate the man to his work. It is particularly valuable to measure personality or temperament because of the need for adjustment of worker to fellow employees and working environment rather than strictly technical skill.

Earl E. Foley, division personnel manager, PG and E, Fresno, told of the need for the company to sell itself to a new employee before it can convert him from an applicant to a capable and interested worker. In order to emphasize his point fully, he and other representatives of the division presented a skit showing the right and wrong way to indoctrinate new employees. H. O. Thomas, R. G. Hoffman, Iran Chinn, San Ragan, and W. L. Harris enacted the parts.

Purchasing and Stores Group

William DeWaard, San Diego Gas & Electric Co., sponsor.

The procedures followed by utility companies in checking and approving invoices, exploring the possibilities of improving present systems used, and investigating the safeguards set up to check prices paid for materials and supplies, and to take advantage of authorized discounts on invoices, were presented to the purchasing and stores group by John Zimbleman, San Diego Gas & Electric; George Coughlan, P. and E, and William Maddock, Southern California Gas Co. Before payments are made for material purchased on contracts carrying escalator clauses, the terms and price policies in effect at the time of completion or delivery must be closely scrutinized it was maintained.

To insure that advantage is taken of available discounts on quantity purchases, close collaboration betw purchasing and stores departments is essential.

R. E. Mackersie, PG and E, recommended an up-to-date pricing record as a guide in checking prices and as a purchase reference.

Supply expense was discussed by J. K. Uhler, Southern California Edison. He talked of the methods used to distribute purchasing and warehouse expense and the factors included in stores operating costs. R. E. Fritzer, San Diego Gas & Electric, deemed that material inventory control was imperative to insure an adequate supply of material vital to present increased construction requirements. A perpetual inventory seems to be the best method.

H. H. Scoville, PG and E, led the discussion on the changing standards of material and construction which are a source of worry and expense to purchasing and stores departments.

Credit and Collections Group

K. L. Boosey, sponsor.

A forum type of session was held by the credit and collection group covering a variety of problems.

All of the utilities are attempting now to build up adequate credit files by which more intelligently to use the amount of credit that can be extended, especially to commercial and industrial accounts. This is important as companies gradually slip into the anticipated tight money period.

All were agreed and recommended that there should be separate "crying rooms" where customers with credit problems could have them discussed privately.

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Courtright Neal Dostal

Every utility has a different opinion on what a past due domestic account is and it would be a definite movement in the right direction in customer relations if management of all Pacific Coast utilities could establish a date when all domestic accounts are considered past due. All companies then could use a similar follow-up procedure for collections.

Accounting Group

C. B. Bradshaw, sponsor.

What to do for physical storage of records and how soon should they be destroyed was the topic discussed by W. H. Hooper, San Diego Gas & Electric Co., for the accounting group. The problem in connection with the physical storage and recording and control and destruction of records has been one of increasing importance. A survey is being made to compare the procedures of the various utilities with the idea of recommending changes to the regulatory commission. The Federal Power Commission has recently issued a bulletin which somewhat relaxes existing stringent regulations. Applications of the new rulings should provide a definite measure of relief to the present shortage of space and equipment.

Microfilming of records was talked about as a means of maintaining records over a long period of time with a minimum of bulk and space requirements. Different applications by member utilities were reviewed. They have had various degrees of success with such a system. A. T. Kelly, PG and E, also discussed the pay roll preparation by punch card methods.

An outline was presented of proposed plant and expense budgeting based upon the functional concept of accounting. The Southern California Edison Co. is revising its budgeting procedures to permit more efficient matching of departmental costs with departmental authority. Because the proposed budgeting system is somewhat different in principle from those generally used by member companies, it was submitted to the accounting section for comment and criticism.

A skit, *Please Pay, Lady*, was presented at the end of the meeting to illustrate some of the techniques in asking questions to pay promptly. This followed a paper by R. J. Straub, PG and E.

Business Development

INSTEAD of parallel meetings of its various committees, the Business Development Section met as a body to review the work of each of its component parts. Section Chairman E. W. Meise, San Diego Gas & Electric Co., called it a natural follow-up to the morning general session in that it would provide more suggestions for the people in the sales and commercial end of the business as to what the job for 1948 was to be.

The section held two meetings, one on Thursday afternoon, the other Friday morning; J. S. C. Ross, Pacific Gas & Electric Co., presiding as vice-chairman over the first, and H. C. Rice, Southern California Edison Co., chairman of the electrical living committee, over the second meeting.

Ross prefaced the meeting by declaring the situation one of change, with many problems not anticipated in the normal postwar planning that had been done by the industry. This has called for unusual demands. Rising costs, inadequate wiring, and the demand for electric air heating had all been unpredictable.

The Friday meeting was devoted to the various subcommittees of the electrical living committee. Rice pointed up the importance of the residential business by declaring that while it accounted for only 14% of the kilowatt-hours, it produced 33% of the revenue power companies earn. He also gave surprising figures on the growth of kilowatt-hours consumed per person in the area. In 1930 the consumption was 180 kwh. per person, in 1946, 341, in 1947 it is 380 and by 1950 it is expected to reach 420. He also reminded that the domestic customer, the largest number, some three million in the PCEA area, had been the most neglected and denied. They had been denied merchandise, lighting and wiring. Another startling figure was that since 1941, when the restrictions were put on home building, there have been 200,000 homes built in the area, limited in capacity to two and three circuits.

Summaries of the individual presentations and reports made at this session follow:

Air Heating and Air Conditioning

To study the present market, to apply proper engineering and equipment "that we may know our job when the buyer's market returns," was stated as the policy of the air heating and air conditioning committee by George E. Zelhart, Pacific Gas & Electric Co., Fresno, chairman. The committee will study the value of electric heating installation to the manufacturer, jobber, dealer, as related to its cost of selling, and its value to the utility as related to its cost to serve. Although electricity is a premium fuel for heating and is sought by prospects who can take advantage of its characteristics and pay for its plus values, the market possibilities seem to be large. Likelihood of decreased costs is small, Zelhart pointed out, because of increasing labor, transportation and manufacturing costs.

Second objective will be to develop data from the field which will permit better engineering of installations. Heat pumps and panel heating seem to have caught the public's fancy because they contain an element of modernity and seem to imply the possibility of something for nothing. However, it is necessary to learn their operating characteristics and to that end the committe will investigate the various principles involved, inquire into maintenance and failures, examine the

Starkweather Sues

Ballman Kasle Kyte

connected load etc., and read and record temperatures so that more intelligent engineering of this type of installation can be done.

Advertising

E. R. Dunning, vice-president, N. W. Ayer & Son, Inc., New York City, was a guest speaker at the request of the newly formed advertising committee. He was introduced by Milton Sanders, past president, and now chairman of the new committee. Dunning described the progress of Business-Managed Electrical Companies which began six years ago, supported by 52 small companies, and now carried on in radio and magazine advertising by 174 companies. It is the sponsor of the radio show, *The Electric Hour*. Constant check is made by means of surveys to determine what effect the program has had upon the public ignorance of the electrical industry. Dunning showed numerous charts with the difference in viewpoint recorded by these surveys since the original program started. He stressed the importance of good public feeling by reminding that the industry must raise $800,000,000 each year to finance its present plant expansions and that much of its old equipment must be replaced at costs of $1.60 per unit for what cost $1 before; and that rate increases may be necessary and a friendly public would accept the utility's side of the case.

Codes and Ordinances

"You're in this too brother," M. G. Sues, Sues, Young & Brown Co., chairman of the code and ordinance committee told everyone as he discussed the responsibility of everyone in the industry in regard to electrical installation codes. The work of the PCEA committee, he said, has three objectives: (1) To represent the industry itself with authority. (2) To provide law-making bodies with technical information. (3) To promote uniformity of electrical codes and ordinances.

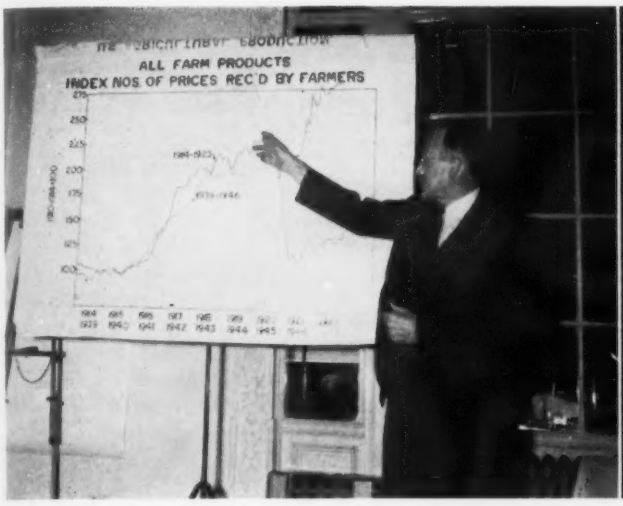
The new edition of the uniform electrical code, he said, must be sold to all the cities that had previously adopted it in the older edition and to all other communities in the area if possible. He likewise said that the unsafe appliance ordinance, now enforced by 90 cities and one county, has made it no longer profitable to send into the California market unsafe and unapproved appliances.

LPG

"One out of three use it," was not the claim of a toothpaste maker warning of pink toothbrush or bad breath, or B.O. It was the startling fact that one out of three rural domestic electric customers in California are now using liquified petroleum gas or LPG, and that the marketing production shows an increase of 289% during the last ten years. This was brought out dramatically by R. I. Mendes, research man, PG and E, San Francisco, chairman of the LPG competition committee.

Mendes analyzed the causes for this acceptance, the inability of the electrical industry to supply new customers with service or equipment, the growth of the dealer organization in selling LPG, the misapprehensions of the public regarding costs of operation and of the appliances, and the high cost of wiring as a contributing factor. The effect of these causes has been a tremendous increase in the use of the bottled gas. How the LPG industry is cashing in on the CP gas range promotion and the development of the large, tank-type installation, which would be more costly to replace and thus provide more serious

Meise Hruby Fenner Rice Reynolds



Dr. Wellman

Mendes

competition, was also brought out.

For remedies the committee recommended mass education regarding the advantages of electrical appliances, special programs to meet the competition, continued research and developments of plans for action. Among the special programs, they urged more diversion of electric merchandise to the vulnerable competitive areas, more work with electric dealers and more cooking schools, as well as over-all tie-ins with the NEMA *Go-All Electric* program. For research the committee suggested investigations to reduce wiring costs, study of range rental plans, watching encroachment upon the agricultural and commercial industrial electric load, development of trade-in programs, and keeping a finger on the pulse of the competitive situation.

Agriculture

Dr. Harry P. Wellman, director of the Gianinni Foundation, and professor of agricultural economics at University of California, reviewed the agricultural situation as it stands today in relation to the over-all economy of the state of California. With agricultural income highest in history except for a recent slight decline in fruit prices, Dr. Wellman traced the relationship between industrial price levels and agricultural levels. He said bluntly that we are in full-blown inflation, with high land values, more disposable income, and more public demand. One way to reduce the inflation, he said, and the only way, would be to reduce income of the people.

Although the OPA had been effective in holding prices reasonably well, he said this has merely postponed inflation and that prices had broken loose when the ceilings were taken off because of the unstable economy that led up to it. The war, he said, could have been financed by taxes, instead of by buying bonds, and inflation prevented. Price increases must stop soon, he said, or "if it doesn't stop you'll see one hell of a crash."

Power for Industry

Although many companies are finding their peak demands to be very close to their total installed capacity and 1947 is a most uncomfortable year, William O. Kyte, General Electric Co., stressed the need for no letdown in industrial development work. He advocated changing of the name of power sales engineers to power consultants and enlarging the scope of their work as advisors to industry on the utilization of electricity to their processes. Second recommendation was to build up the industrial power section to take care of unprecedented demands upon the utility companies. Third was to create a visual education department to assist the industrial, domestic and commercial sales managers to inform the public, and, fourth, to give intensive training to each new man engaged in this work. He quoted Edwin Fleischmann in ELECTRICAL WEST as saying, "that country is most prosperous, that area is most prosperous, that industry is most prosperous, that uses the most electricity and uses it the most efficiently."

Dunning Sanders

Electrical Living

The complete electric kitchen job for 1948, B. W. Reynolds, General Electric Supply Corp. said, could not be realized because of shortages. He summarized it as making it easy for the customer to buy the complete kitchen as a package. This required planning first, then installation and proper servicing to satisfy the customer. He said there was a pent-up demand of 17 years since the depression, and this had been developed by the dream kitchen publicity throughout these years. The kitchen, he said, is a big package to sell—from $1,500 to $5,000 — requires considerable work and planning. He then introduced Harold Hugo, Westinghouse appliance department, who outlined his company's kitchen and laundry planning technique with which it is equipping its key dealers.

Home Economics

"The trick is in the training," Marguerite Fenner, Pacific Gas and Electric Co., chairman of the home economics committee, said in following up two previous talks in which she had outlined a program for home

economics departments and the formation of such a department. The logical follow-up, she said, was specialized training of the home economists that they may do their work more effectively.

Besides needing social poise, the ability to talk easily, interest in people, an alert, inquiring mind, and a sense of responsibility toward her work, plus a college degree and the ability to cook, a home economist requires a thorough knowledge of the use and care of appliances modern women use in the home.

Thus to provide special training with such appliances the home economics committee has developed a training program called its *workshop* which will be held in Los Angeles, Feb. 19 and 20, and conducted by a group of experts in the various types of electrical equipment. To this workshop she urged that all home economists of utilities, manufacturers, distributors, and dealers be sent for a thorough-going refresher course.

Adequate Wiring

In three charts Elbert Kramer, chairman, adequate wiring committee (Westinghouse Electric Supply Co.) gave the dollars and cents stake of the electrical industry in adequate wiring of California's postwar homes. In the five-year building program ahead, it is estimated 700,000 homes will be built, or an average of 140,000 per year. Of these 10%, it is hoped, can be certified as adequately wired. He then broke down what the 14,000 certified wired homes per year would require in the way of wiring, refrigerators, washers, waste disposers, ranges, water heaters, bathroom heaters, a total of $9,386,500, and compared it with the equipment that the non-certified homes would require. From a standpoint of dealer and contractor cost figures alone, the average certified home would cost $670 as against $283 for the non-certified home, a gain per certified wired home for the industry of $387. Of this the wiring contractor's gain would be $120, and the equipment dealer's would be $267.

Kramer then outlined the various promotional steps that will be taken by the committee to acquaint the industry and the public with the needs for the adequate wiring and to try to increase the number of certified homes.

Home Laundry

How the home laundry market has been increased by the introduction of the automatic washing machine and the automatic dryer, was graphically told by Paul Buhler, L. J. Meyberg Co., substituting for W. D. Dudley, of Frigidaire. He traced the introduction of the automatic washing machine which now represents 23.8% of the entire market, and $100,000,000 in excess of the total for 1941.

Because of higher prices of automatics they represent 41.3% of the dollar value of the entire washing machine industry. Dryers in 1941, only 5,000 of them, represented a million-dollar industry. In 1947 with 66,000 it will be a $15,000,000 business. Despite good climatic conditions the West is still an exceptionally fine market for dryers, he pointed out, because of the demand of housewives for them because of the service they perform.

He felt also, that the ironer would benefit from the complete laundry promotion. Altogether the home laundry equipment industry is a $685,000,000 business, and is next to radio and refrigerators in total business. Surveys show that 36% of the women want automatic machines, he said.

Home Lighting

L. H. Hruby, lamp department, General Electric Co., Los Angeles, had a three-fold job, substituting for L. A. Hobbs, chairman of the home lighting committee, and John Cain, neither of whom could be present. Hruby said the residential lighting field had been asleep for six years, and even now has not recovered although industrial and commercial lighting have. Postwar housing has contributed nothing to the improvement of lighting, he said, citing a $15 allowance on an $8,000 home in one of the large housing projects. This is even lower than prewar, he declared. Even model postwar homes, highly advertised, with trick lighting, provide less than 14 footcandles at any seeing location.

He maintained that the Planned Lighting Program held the only possibility for the industry to re-acquaint the public with home lighting needs.

Hruby then discussed the Certified Lamp Program, the residential fixture industry's certification program, and their tie-ins with the planned lighting for the home program. Surprising statement was that the Los Angeles area has become the third largest portable lamp manufacturing region in the U. S. Of 100 manufacturers in the country making the certified portable lamps, four are located in Los Angeles, two in San Francisco. One in Los Angeles will turn out 1,000 lamps a month.

Operating Economics

NEW equipment, new methods and new problems (with some old ones thrown in) held the spotlight in meetings of the widely diversified groups of the Operating Economics Section. Advances in manufacturers equipment and progress of steam and hydro plant construction were among the interesting reports given. Voltage regulation on transmission and distribution lines, with particular attention to use of synchronous condensers, tap-changing transformers, capacitors and regulators had a prominent place in several discussions. Following the opening general meeting the section, under general direction of A. D. Bragg, chairman, and W. T. Johnson, vice-chairman, adjourned to the Power Bldg. for the following group meetings.

Steam Group

Progress of new steam plant construction, outlined by Walter Zitlau, San Diego Gas & Electric; T. M. Hotchkiss, Southern California Edison, and V. F. Estcourt, Pacific Gas and Electric, was first order of business under sponsorship of Donald R. Jenkins. Operation of utilities with peak very near capacity of existing plants has them working feverishly to complete new plants now under construction. Plants are lagging behind "hoped-for completion dates" because of late deliveries and slow construction.

Technological advancements in design and construction of steam generators, turbines and auxiliaries were detailed by the manufacturers. Higher pressure and higher temperature equipment is being installed on the Pacific Coast to give better economy and lower cost of kilowatt generation in the face of increasing cost of fuel oil. It was also pointed out that consideration must be given to using coal in new steam plants when oil and gas become too expensive for power generation.

Substation Group

Sponsored by A. A. Straub, this group first considered in detail several aspects of substation design. Most important, if substations are to be located where good engineering dictates, is design to meet zoning restrictions. First step is to contact public groups and individuals and show the desirability and necessity of non-industrial locations. Interested parties must be convinced the station design will not be objectionable nor affect

Hotchkiss Jenkins

Kipp Jones

property values adversely. Steps to minimize objections are:

1. Good appearance—design should fit into landscape.
2. Minimize noise level.
3. Keep transformers and larger equipment toward rear of lot.
4. Avoid unsightly pole structures, particularly at front of lot.

Elaboration of the last point revealed that use of cables for underground getaway is dictated in many cases by location. One company is using cable (4 kv. to 17 kv.) for locations in the vicinity of which it is anticipated residences may be built. Extra cost of cable in some instances may be justified by more compact arrangement, as well as by public relations value.

Discussion of equipment arrangement centered on high-side protection of the transformer bank or banks. Considerable variation was evident in application of fuses or oil switches on banks of 2,000 to 10,000 kva., and further study of the problem was recommended. Subsequent discussion indicated closer agreement on low-voltage arrangements, using main and auxiliary bus for feeder circuits, the only question being at what point in expansion a bus tie breaker should be used. Past designs have sometimes failed to provide adequate clearances for use of modern hot-line maintenance methods, including washing of insulators. Proper placing of equipment for safe working conditions is a must in new designs. Design features of a new 110/12-kv. station with ultimate capacity of 170,000 kva. being built in downtown San Francisco were then discussed.

Use of mobile substations by several utilities has been very effective, not only for emergency breakdown, but for maintenance and reconstruction. Some reduction in spare transformer investment may be effected through use of a mobile spare unit.

Extensive installations of static capacitors on the PG and E system, (150,000 kva. against peak load of 490,000 kw.) were described by R. D. Likely. To date most capacitors are unswitched or manually switched, with more automatic installations as equipment becomes available.

Two types of supervisory control were discussed — first was the San Diego Gas & Electric installation with ten controlled stations at present, six more planned. Edison's installation, with ten stations being controlled and plans for a total of 50, was then described by R. B. Pollock.

One highlight of the group's discussions was a concise and crystal clear presentation by A. A. Kroneberg on voltage regulation of transmission lines. Using the Edison system as an example, he showed in a few minutes the relationship, effects, and limitations of synchronous condensers, tap changing transformers, capacitors and regulators on voltage regulation.

Meter Group

Programs for training and education of electric metermen received serious consideration by this group, sponsored by E. B. Kipp. Re-establisment

Grummett Middleton

Dinapoli Schweers

of former programs to alleviate the present shortage of trained men was advocated as a result of a discussion led by R. V. Jones. C. C. Blecksmith, Duncan Electric Mfg. Co., headed discussion of corrosion of meters due to unfavorable climatic conditions. Considerable interest and research on this difficult problem indicates an answer eventually will be found. Closer cooperation with the EEI meter committee was advocated after a discussion led by F. A. Redding and K. M. Stevens. Semi-annual meetings of the PCEA meter group were held to be inadequate to promote proper cooperation among member meter departments necessary to present a united front to the EEI and manufacturers. Organization of the all-utilities standardization committee operating in Southern California was described by R. E. Marshall. Some difference of opinion on retirement of obsolete meters was brought out in a discussion led by Earl Hart. Present problems and future plans of the manufacturers were presented by A. L. Carvill, General Electric Co. Despite this year's production increase of 70% over 1946, he said meters will be "tight" until 1950, and users are urged to anticipate requirements and place orders well in advance.

Hydro Group

Meetings of the hydro generation group were resumed with C. W. Schweers as sponsor after a number of years. New plant developments of the PG and E were presented and detailed discussion of the design of their five new plants led by D. P. Dinapoli. Considerable interest because of labor and economic conditions was shown in discussion of automatic trash rake cleaners and their operation based on past experience. Because of the many problems and the increasing importance of hydro developments in the light of present fuel costs and anticipated scarcity, it was decided to continue meetings and studies by this group.

Transportation

Under sponsorship of R. M. Middleton, C. H. Rhudy led a discussion of the use of labor-saving automatic machine equipment such as tractors, portable cranes, pole-hole diggers, winches and power-operated take-up and pay-out wire reels. Operation of carryall-type vehicles for transportation of heavy construction line crews to and from the job and for distributing men and material was described. During final cleanup the main crew is at times enabled to move on to other jobs, or travel time can be reduced by leaving the heavy truck in a parking place near the job. Types of bodies presently used for general and special service were discussed and illustrated with photos. S. B. Shaw, PG and E, covered proposed new garage buildings and equipment for various numbers of vehicles, including combination store room and garage buildings. Equipment required for maintenance of different numbers of vehicles also came in for discussion.

Gustafson Yarnell

Transmission and Distribution

O. A. Gustafson was called on to pinch hit for W. R. Johnson as sponsor of this, one of the best attended groups. A great and continuing interest was shown by discussion led by N. K. Yarnell of the merits of package vs. assembled substations. Considerations of minimizing time and labor, as well as flexibility and expansibility through use of prefabricated units, were well covered.

Engineering and operating problems were pointed up by discussion of combined application of regulators and pole-top capacitors on distribution lines. Complexity of the interrelation of these two, and how to use one or the other or both for best results, was a problem judged worthy of further careful investigation. Along the same line was a discussion of voltage regulation problems on long rural distribution circuits. Operating experience with series capacitors on two lines of San Diego Gas & Electric was presented as an example of one approach to a solution of the problem. A questionable bench mark was indicated by one comment that 105 volts might be considered a tolerable minimum in at least one case—complaints from pinball machine operators had dropped off when that voltage was maintained!

Advantages and limitations of aerial cable for primaries and secondaries were discussed at some length, supplemented by photographic examples of several typical installations. Consensus was that until more data are available each application should be based on its particular economic conditions, with the added proviso that certain cases may offer no alternative because of physical conditions. E. N. Wright presented some interesting data and observations on all-aluminum vs. alloy or steel-reinforced aluminum cable for transmission and distribution lines. Present unit costs, he concluded, warrant consideration of all-aluminum for 66 kv. and below. Operating experiences with post, pin and suspension-type insulators occasioned a round of comments indicating the importance of considering local conditions before specifying class of insulator to be used.

One of the highlights of the program was a colored movie shown by D. Z. Bigler of helicopter patrol of Edison's high-voltage transmission lines. Some six months of operation patrolling 1,800 circuit miles (1,200 line miles) have been quite satisfactory, and costs have been closely comparable and in some cases lower for the helicopter than for conventional ground patrol.

Communications

Sponsored by C. T. Malloy, this group discussed briefly FCC action on television interference caused by mobile equipment. Of greater moment, however, was the group's urgent recommendation that utilities take definite action toward using channels now allocated them. By filing application or placing orders for equipment without delay, they may forestall losing channels reserved for them by the FCC but thus far unused.

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

January 1948

Everyone has been giving the crystal ball quite a workout with 1948 predictions and opinions. Take from them whatever you like. "You pays your money and you takes your pick." All that will be ventured here is that demand will be overtaken by supply and that means selling the surplus. It has already done so in many instances, so the prediction is a safe one. 1948 looks from here like a competitive year.

Crystal gaze

Charlie Wilson, daring young man of the General Electric circus, took a flying leap from the high platform of prices to catch a trapeze at some 2 to 10% lower swing on appliances and fractional horsepower motors. This sent the other manufacturers scurrying back to their pencils to see if they too could figure how to follow. With more wage demands on the horizon, come contract time, it did not seem possible. But it may.

All girls he will please

What it may mean is that G-E is in full stride now, with improved productivity from by-now trained labor, and with materials in stock or in sight for steady output, and it looks to volume of sales to balance off costs. This is quite a challenge to its competitors.

Giant aroused

Two big events in the appliance industry in the West in January and early February are the Spring Conference of the San Diego Bureau of Radio & Electrical Appliances, at U. S. Grant Hotel, Jan. 29; and the market weeks in Los Angeles and San Francisco. Los Angeles market week will be Jan. 26-30. San Francisco's will be Feb. 2-7.

Dates

Western Merchandise Mart, headquarters for the San Francisco appliance, furniture and housewares showings, its new wing in full use and with the last of the government agencies moved out, returns to a stricter admission requirement. To keep the Mart a marketplace for dealers only, and not the public, passes are now required. Qualified dealers and buyers are eligible for them on request.

Dealers only

As yet the big time national speakers for the Western Radio and Appliance Trade Dinner, Wednesday night, Feb. 4, had not been assured so cannot be announced in this News Letter. From past affairs of the same kind, it will be a big dinner, with big name speakers from the appliance industry, plus some high class entertainment.

Trade dinner

The new look at this market can be expected more to come from the displays than the merchandise. Minor detail changes are all that are indicated in advance for standard appliances. Don't look for anything radical. But come to get some new slants on selling, display, sales helps, etc.

What's new?

New wage rates of radio and appliance sales people in Seattle were settled after months of negotiation. Inside sales people get a new monthly rate of $250, with a $2,500 quota and 7% thereafter. Previous rate was $125 with $1,250 quota and 9%. | New scale

Manufacturers are warned by Philco's experience with the Federal Trade Commission, after being called on the carpet for its "Sell 'n Win" campaign. FTC considers unfair competition any plan which induces sales personnel of independent dealers to push one line to the exclusion of others. It is against the trade practice rules of the radio set industry, it points out, to offer "spiffs" or "push money" or other bonuses. | No spiffs

Before the number of coin operated automatic washing machine neighborhood roll-your-own laundries reaches that of the late miniature golf courses, a number of interesting tie-ins are taking place. Westinghouse has a program of linking its Laundromat dealers with its Half-hour Laundries in sales promotion and prospects. F. L. Jacobs has developed a "complete package" deal to prospective self-service laundry operators with Launderall machines, through the Launder-Ease Corp. | Laundry ties

Thor has bought into the Lustron Corp. and thus will be linked with that unique company's plan to build and merchandise steel pre-fabricated houses. The houses, needless to say, will be equipped with Automagic dish and clothes washer sinks. Just how they will be sold has not yet been announced but Thor personnel are talking houses these days. | Steel houses

Keese Engineering Co., Hollywood and San Francisco, specializing in ultraviolet and effect lighting, have a new KKRP filter which makes possible two new black light tubular lamp units at attractive prices. The units are designed for 15 and 30 watt black light lamps in 18 and 36-in. units, respectivaly, 2,000 hr. life rating. | Black light

Hotpoint, with rivalry to its brother G-E on one hand, and the rest of the industry on the other, has cut itself a big $20 million expansion program and set itself the task of selling 1¼ million major appliances in 1948. This challenge was laid down at the San Francisco distributors meeting for the West by Leonard Truesdell, vice-president. Water heater production will be three times 1941; dishwashers 20 times. Metal kitchen cabinets and disposals will likewise be pushed strongly. | Big challenge

J. Sayer Seely has been named western field manager for the Lewyt vacuum cleaner and will make his headquarters in San Francisco. | Rep.

Whether or not the new tax exempt cooperatives should be taxed the same as any other business enterprise was given House Ways and Means Committee at hearings that lasted all through November by 43 witnesses from business and 34 coop advocates of exemption. For the first time some of the real figures on what this exemption means as a handicap came out. It will be to the interest of every dealer to urge his congressman to get these facts and equalize the scales of justice. | Out of balance

I. P. Pruitt, western district manager of General Electric Credit Corp., recently announced the appointment of Elmer G. Foster as manager of its new branch office in Seattle. A former Oregon State College student, Foster joined the company in 1946. | Advanced

Frigidaire Division of General Motors is now producing a five-ton capacity packaged air conditioner for use in stores, restaurants and business establishments. Unit occupies 7½ sq.ft. of floor space and is completely self-contained. Throughout the country regional air conditioning schools are being sponsored by the company for dealer engineering personnel. Training course for the Pacific region was held at Oakland on Jan. 5.

Packaged unit

National Union Radio Corp., Newark, N. J., has announced an approximate 12% increase on its prices of radio receiving tubes to equipment manufacturers.

Going up

In announcing a new distribution program for its air conditioning line, Westinghouse has reported plans to more than double its production of the equipment in 1948. Expanded program of trade paper and cooperative newspaper advertising is scheduled to start early in the year.

Plans this year

Poulsen & Nardon Inc., Los Angeles producer of small washers, have been accepted for regular membership in the American Washer and Ironer Manufacturers' Assn., according to Roy Bradt, president of the association.

Member

Eureka distributors were shown the company's new deluxe upright cleaner at a series of meetings held recently at the factory in Bloomington, Ill. Body of the cleaner is streamlined and low-slung; will sell at $64.50.

Cleaner preview

Competition for the Lewis & Conger Annual Home Safety Award will last through January. Manufacturers of home appliances, home equipment and home furnishings throughout the U. S. are eligible. A bronze plaque in addition to a special advertising and display campaign will be awarded to the winning product sometime in February.

Still time

Winner of the national window display contest put on by the Electromode Corp. during the week of Oct. 6-11 was The White House, San Francisco. Personnel participating from The White House won first prize of $200. Bob Odell, salesman for the Leo J. Meyberg Co., who serviced the account, won $100.

Store winner

Improved features on the 1948 line of Kelvinator refrigerators include top-to-bottom refrigeration for the first time, with full cabinet-length doors. A refrigerated fruit freshener inside the bottom of the cabinet provides storage space for fresh fruits. Top models have built-in frozen food chests extending across top of the interior. Retail prices will range from $214.95 to $359.95.

Advanced models

"We've Got A Date in '48" is the slogan which will open Universal's 1948 campaign to promote Universal ranges, water heaters, vacuum cleaners and small appliances. Greatest percent of Universal's advertising dollars will be directed at the point of sale, says W. J. Cashman, director of promotion. Company also announced a heavy gage ribbed edged box designed to hold a Universal electric blanket for protection from soiling while on display.

Ready for action

New device offered by Automotive Products Division, American Associates, Inc. affords greater safety for garage workers. Called Pur-O-Zone, the device operates on 110-volt alternating current and will quickly purify the air through the production of ozone.

Pure air

Portable food mixer put out by Westinghouse is now being distributed to the New England States. Company says distribution will be extended to other areas as production increases. — Mixer out

Kitchen Kraft Corp., Chicago, has contracted with Bell Aircraft Corp., Buffalo airplane manufacturer, for the production of 100,000 medium-size dishwashers next year. Washers will be made in three sizes, 24, 48, and 84 inches and will be sold nationally, according to Kitchen Kraft president, Thomas Howard. — More dish washers

Health and sanitation will be the leading theme for 1948 in the sale and promotion of vacuum cleaners. Sponsored by the Vacuum Cleaner Manufacturers' Assn. a recent survey was conducted throughout the U. S. to determine why more women don't own vacuum cleaners. Found that most reasons given by non-owners can be set aside by intelligent selling. Survey indicated that more than one-half of the occupants of wired homes in the U. S., or 15,885,000 families, don't own vacuum cleaners. Campaign by manufacturers will emphasize diverse uses of cleaners and its tools as an added appeal to the housewife. — Survey tells

Coast sales representatives attending the three-day sales meeting of Victor Electric Products Inc. in Cincinnati were: Harland Meyer, Denver; Marion Baxter, Seattle; L. M. Baxter, Portland; Leonard Honn, Seattle; Allan B. Carpenter, Denver. Conference was highlighted by introduction of the new Victron electric fan heater. — Reps. meet

Jamestown Metal Equipment Co. Inc., N. Y., announces that it has adopted the name of its subsidiary, Blackstone Corp., for the parent company. Products of the new Blackstone Corp. will be home appliances, including a full line of domestic laundry equipment, automotive radiators, heaters and stampings. — New name

Three retail salesmen on the Coast were winners in the October phase of Bendix's "How to Sell" contest. In the top prize bracket C. E. Baker, 1091 Bush St., San Francisco, was awarded an automobile. Complete Bendix automatic home laundry went to G. A. Clough, 568 Second Ave., Salt Lake City; and to Thomas E. Coury, 134 E. Glendale Ave., Glendale, Ariz. — Lucky ones

Latest appliance from General Mills with Betty Crocker's endorsement is a steam ironing attachment for the Tru-Heat iron. Deliveries to distributors scheduled for February. — Steam device

Techniques involved in specialty selling are discussed in "The Selling Man," by H. A. Matheson, executive vice-president of the Eureka Williams Corp., Bloomington, Ill., in charge of the Williams Oil-O-Matic Division. This new book deals with fundamentals basic to all selling. Price is $5. — Approach to selling

National Pressure Cooker Co., and Pressed Steel Car Co., have announced that Presto Deepwell-pressure cookers will be on the market soon as standard equipment of the Presteline custom "8" electric range. — Out soon

Aviola Radio Corp., Phoenix, has discontinued production of its radios and cabinets, according to Michael Kagan, vice-president, who said that the company will sell or lease its 143,000 square foot plant. This move, he pointed out, is attributed to "unstable inventories" in recent months and a flooded radio market. — Stops operations

Sunbeam Corp. has under construction a new $2,500,000 plant in Chicago. The one-floor factory will be devoted exclusively to the manufacture of small appliances. — Plant going up

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ELECTRICAL WEST Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © January, 1948

"You're In This Too, Brother!"

In what? Well,, if you sell appliances you can't help yourself, you are affected by this sales choker —**inadequate wiring.** What is it, in words of one syllable?

As Col. Stoopnagle would define it, "Wiring is stuff that if you haven't enough you can't enjoy your appliances, and that's quite a shock."

It is wiring that isn't fat enough or strong enough or big enough or convenient enough so that the people who buy your appliances can use them with any satisfaction.

Now you may not be in the wiring business, but wiring is **your** business if it stops your sales. That is why, as a speaker said at a recent meeting, "You're in on this too, brother!"

At the end of every appliance is a plug. If there is no outlet convenient for it to plug into, you may have **returned merchandise, complaints** or **needless service** and **no sale.** So outlets **do** mean a lot to you. Ample wiring turns your customers into satisfied boosters.

What can **you** do about it? It may be up to the wireman and contractor to install it, but you can help **sell** it. **You** are the **salesman.** Contractors need your boost to sell wiring.

Advise people to go to a good contractor to have wiring put in. Makeshifts with wiring are not **safe.** A contractor knows the code rules, has the proper materials and fittings, has skilled men to install it without wrecking the place or running a lot of unsightly cords. Cords are usually too small to carry proper voltage very far. Cords only choke up an already gasping wiring system.

Another thing you can do is to drop hints whenever you get a chance. Just simple ideas that people will agree with and continue to think about. Flash them in conversation or sales talk. Put them in store ads. Make up window cards with them. Paste or print them on sales tags. Repeat them often. It takes constant reminding.

Here are some of the ideas to use—

"Your appliances won't heat quickly if they are not fed properly, you know. It takes good sized wires to give them what they need."

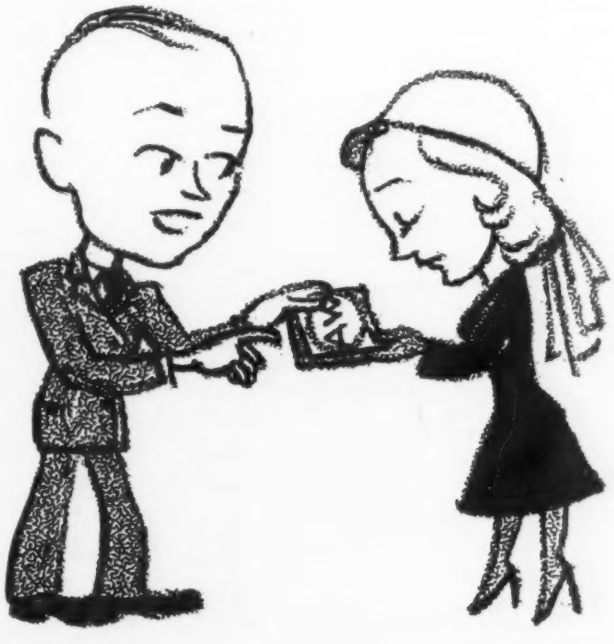
"Watch that thief in the wire—too small wires take a toll day in and day out on your electric bill. You pay for electricity at the meter where electricity is healthy and strong. Why waste it pushing itself through too small wires before it even reaches the appliance."

"Your home will have better resale value if it is wired for convenience."

"Your appliances are designed to give you service and pleasure. When tested at the factory they performed as they were meant to. Good wiring in your home will give you the same performance from them."

In your contacts with customers make use of the booklets and pamphlets of the National Adequate Wiring Bureau. Your local utility probably has them or can get them for you.

In a few words adequate wiring means installing a large enough service equipment to supply future and present needs, more outlets, bigger wire.



Be financially successful

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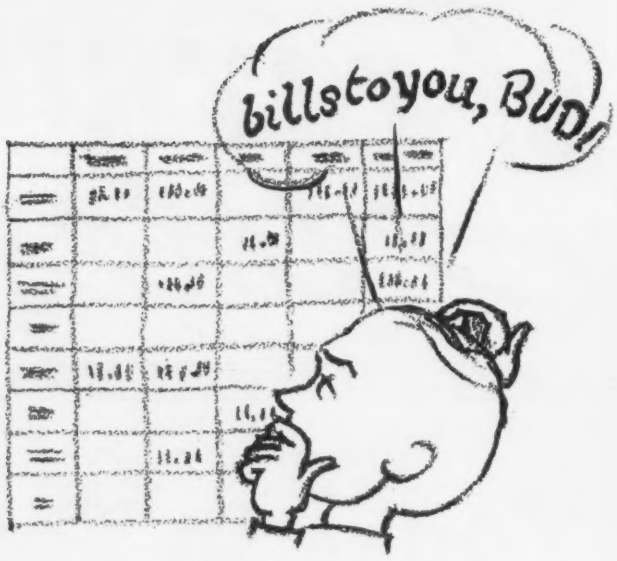


WHEN you pay your bills is important. It is important both to you and your creditor. On your part, it takes two kinds of planning—first, arranging for the actual physical work to be done, e.g., checking amounts, verifying billing with receiving record, etc., and second, planning to have the cash on hand with which to pay the bills when they become due.

In addition to the regular records that are needed for the purpose of showing the progress of your business and compiling the necessary information for tax returns, certain other memorandum type data must be kept to aid in cash planning and maintaining expense control. An otherwise healthy and sound business may be kept in a very precarious position by overinvestment in merchandise or receivables. These items, which place a burden on your working capital, must be carefully coordinated with the needs of the business.

It is suggested that cash planning for current needs be done **on paper.** You may overlook possible requirements if you try to keep things in your head.

The use of a large columnar pad is suggested. Across the top, head the columns with your fixed cash requirements, such as rent, notes on furniture and fixtures, and notes payable. Leave a column for subtotaling and head the remaining columns with variable cash requirements, such as accounts payable, pay roll, and utilities. Give careful thought to this first analysis so that nothing is omitted.

The analysis may well be made **60 days in advance.** List the dates vertically in the left-hand column. Enter the fixed amounts in the proper column as of the date to be paid. Total the fixed amounts across to the subtotal column. It is now apparent at a glance two months in advance exactly when the cash needs for fixed expenses will occur. As bills for merchandise and other items are received or as variable expenses become apparent, enter them and total across. This procedure will keep you informed of these cash requirements well in advance of the time you must pay out.

If you find after some experience that many of the variable items—electricity, telephone, pay roll, etc.—can be estimated with some degree of accuracy, the forecasting of these cash needs can be made several weeks in advance. This is important.

If you wait until your creditors start pressing you, your operation will suffer. Nothing is more expensive than operating on funds inadequate to meet current needs. Knowing what you owe far enough in advance to prepare for payment is a definite step toward removing this hazard.

The next step is to see that **funds are provided at the necessary time.** This money will come through the collection of accounts receivable and the liquidation of inventory. It may also come from outside loans. Getting a loan is not a cure but merely defers the need of cash to a later date. Occasional borrowing is sound business practice, but should definitely not be relied on as a last-minute resort.

Advance planning of your cash so that you can consistently meet your creditors' invoices when they are due is one of the best ways you have to build soundly a favorable reputation for your firm.

Neil M. Higbee, manager of the Greenwood store, and at right, P. C. Sogard, manager of Ballard district store, the first

Demonstration of angle reflectors serves also to light the stock shelves

WATTS IN A NAME?

Appropriate name for as dynamic an electrical man as W. A. Watts of Seattle, who heads the dealers' association, is active in the contractors', runs three north-end stores in residential districts, does an all 'round electrical business from line construction to hair curlers. Watts had no idea of being in business until 1931. As a wireman out of work he went to Grand Coulee for a job. There was no electric shop there and the union persuaded him to start one. Those were the wild days, said Watts, when Coulee city was a hell-raising construction town. For the flip of a coin Watts sold his electrical business, that he'd started on $17, for $10,000 cash—it was doing $60,000 a year but the dam was nearing completion. Back in Seattle he knew of no combination contracting and appliance business there, believed in it, started one in the growing Ballard district, two blocks from the traffic—but he drew traffic there with advertising. The second store on Greenwood street was started as a sales store only. With many war contracts Watts needed more warehouse space, bought a brick building on Roosevelt Way, and now it has become headquarters. At first it was for wiring only but people came there expecting appliances, so they were put it. Watts had no idea of a chain store operation, but it just grew. He believes every contractor should carry appliances, every appliance store should do wiring for when times are tough both are needed and they help maintain a decent standard of price and service. It adds up that Watts believes in and *sells* kilowatts.

Harry Shafer, James Stuart, R. H. Buston, Ben Bridges and W. A. Watts at main store, shown also at the right above

Even Free Services Have to be Sold

What to do when there's no merchandising is solved by Washington Water Power Co. with 12 plus services

WHEN a power company ceases to sell appliances direct to the public it loses one of the means by which it maintained close contact with its customers. Yet the large number of aggressive dealers now in business and the excellent job they are doing in merchandise selling makes it unnecessary for most power companies any longer to sell direct. How then can they maintain this contact that is so important to them? For it is satisfied users who will be their friends when cranks advocate that they be put out of business and seek to put over elections to take them over.

The Washington Water Power Co., Spokane, is one such company that has withdrawn from merchandising, feeling that dealers can do the job of selling now that the pioneering has been accomplished and saturations and acceptance are high. It does not want to compete with these sales allies; rather it wants to aid them through mass promotions, sales training, backing their association and other cooperative plans. But it also needs contact with its residence customers and they must be satisfied with the service they receive, be conscious of it and appreciate it.

With constant hammering from PUD advocates and subject to election attack after attack, that company feels it must intensify its personal relations with its customers rather than diminish them.

R. B. McElroy, who has headed residential sales and then commercial and industrial sales for Washington Water Power and now directs the dealer co-ordination work, has figured it out that people have an idea they want their own little power company, almost precinct by precinct. Economically such a situation is unsound. The public would lose all of the benefits of mass production and distribution. But it is a yearning that must be faced.

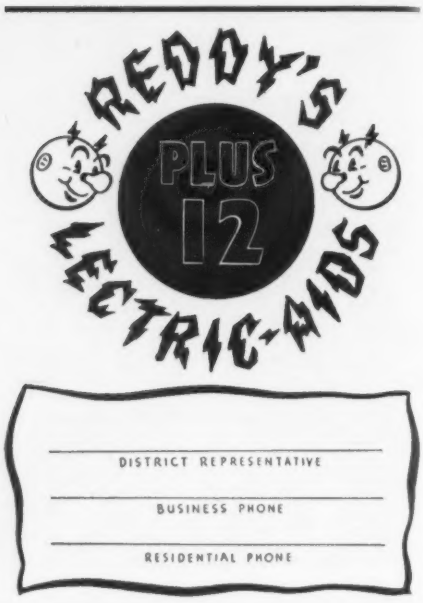
Therefore, instead of a residential sales force, this company will have a district representative in each area who will be the power company to his group of customers. He becomes personally acquainted with all of them, explains the services they are entitled to from the company, handles all their transactions with the company for them.

"We believe that if more and more residential customers know us better they will like us better," says McElroy. "Too often we hear from too many residential customers, 'all I get from the Washington Water Power Co. is a light bill,' and as far as they know that is all that we have to offer. We do have far more to offer, but our weakness has been that we have never told them the many ways we can be of service to them.

"We are satisfied that when our residential customers realize that they can turn to us for unbiased information, it will cause them to be more friendly toward the company. We will be doing something for them that will establish a feeling of friendship toward us. So we have given the 12 types of service we can render a name that lends itself to publicity—'Reddy Kilowatt's Plus 12 Lectric Aids.'"

Following are the twelve ways the company can be of service:

1. ELECTRIC COOKERY ADVICE
   Proper equipment for your needs
2. HOME REFRIGERATION IDEAS
   Storage capacity needs; quick freezing
3. KITCHEN PLANNING
   For step-saving kitchens
4. LAUNDRY PLANNING
   To lighten laundry tasks
5. LIGHTING RECOMMENDATIONS
   Young eyes need good light; old eyes demand it
6. HOME ECONOMICS SERVICE
   Trained home advisors on call
7. WATER HEATING RECOMMENDATIONS
   For plenty of hot water always on tap
8. AUTOMATIC HEATING INFORMATION
   For year-round home comfort
9. PLANNED WIRING
   You're money wise when you're wiring wise
10. EMERGENCY SERVICE
    Lighting restoration at your call
11. RESIDENTIAL RATE ANALYSIS
    Know your service costs
12. GENERAL INFORMATION
    Latest facts on electric developments for the house



Cover of memo pad with representative's name, 12 aids are reverse side

These 12 services have been printed on a clever reminder pad which the customer can also use to list shopping items, etc. The residential representative, each with a territory having from 1,200 to 200 customers, will be the power company to them. He will call on each and in presenting the "magic memo pad," which has his name and telephone number on it, will go through the list with the customer and explain the service each represents and how the customer may obtain it by contacting him.

A series of training classes was held to train these residential men for their job. First they were given training in making the first call and how to cover the 12 aids or services and to establish themselves as the customer's personal representative with the company. Then they were given training in the presentation of information on each of the 12 services.

For instance, in analyzing customer's bills these men break the bill down into each of its blocks and show how many of the total kwh. the customer paid for at the minimum, how many at 3 cents, how many at 2 cents, how many at 1 cent, how many at 6/10 cent. If the customer is not using enough to reach the lowest step, she is told that use of a water heater, for instance, would bring such service on this lowest step.

Some time back the company devised a rate "yardstick," or ruler, by

which it is easy to determine the cost of operating any appliance. This is used in the rate analysis story.

The residential man is preceded on his calls by a letter which tells the residential customer that the man himself will call to discuss the new Plus 12 Plan, an entirely free service.

This entire plan recognizes an old truth, known to sales and advertising men, that even if electricity were given away free, people would not take full advantage of it. Even the services that go along free with electricity have to be sold. When they are sold they create more satisfied customers, and more satisfied customers, this company feels, will want to keep it in the business of serving them, since they do it so well.

The plan also eliminates one of the most subtle sources of annoyance on the part of customers. They call in. They do not know whom to talk to. They get switched around from one office to another until they are worn out and disgusted. Now they can call their own personal power company, the district representative, and he will steer their requests through the right channels to bring them satisfaction.

Electrical Show Boosts Business

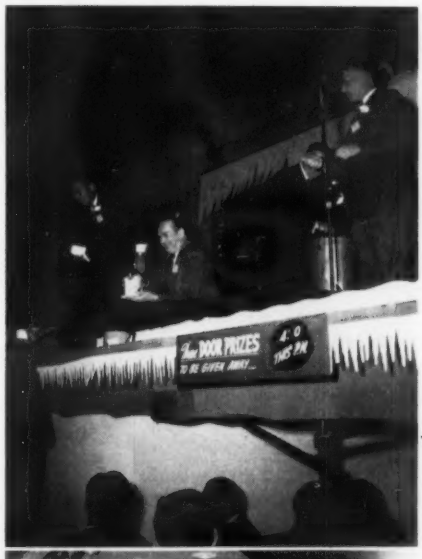
San Diego Bureau revives prewar exposition just before Christmas

WHEN San Diegans will go out in the rain (and such a rain!) that's news. They did just that and in crowds that overran the parking facilities at Balboa Park, for the tenth annual electric and home appliance show. By estimating from sample counts, well over 135,000 people attended the six-day exposition, Dec. 2-7. More than 100 manufacturer's products were displayed and demonstrated in 43 exhibits sponsored by distributors and manufacturers and manned by local dealers' salesmen. Sales resulting from the show were estimated at more than a million dollars.

It was the first show since the war. Former world fair buildings in Balboa Park, taken over for extra Navy hospital wards during the war, were only now available and the previous and larger show building had been condemned. The San Diego Bureau of Radio and Electrical Appliances, experienced in nine previous expositions, moved it to another building, the former Federal building, provided new and uniform backgrounds, got its manufacturer and distributor members to divide the available space, recruited 1,000 dealers and salesmen to take shifts on manning the displays, blasted the San Diego County countryside with publicity, and the crowds flocked in. The first four days it poured rain, but eager people, thinking no one else would be there, packed the Federal building from noon to 11 p.m., some having to park as far as a mile from the building.

The committee handling the exposition, headed by J. Clark Chamberlain, secretary-manager of the bureau, consisted of O. G. Thompson, president; Archie Marsden, Bob Redfield, Ed W. Meise and Gene Cramer. San Diego Gas & Electric Co. gave help in many ways, "Doc" A. E. Holloway, vice-president in charge of sales, being an ardent supporter of the bureau and its activities. Forrest Raymond, advertising manager, organized the publicity and advertising splurge that sold the show to the people—posters on all cars and buses, 55 news stories in city and county papers, ads, two special 16-page, two-color advertising sections on a morning and evening paper, filled with dealer and distributor and utility ads, and a hook-up with local radio station KUSN, which also furnished local talent entertainment and broadcast from the show.

Door prizes being given by Archie Marsden and O. G. Thompson, while Paul Dupont draws tickets and J. Clark Chamberlain announces. Below: Certified lamps in one booth and a "pitch" on a bagless electric cleaner in another



Door prizes were numerous and yet not costly, nearly all of them purchased by the bureau and given away without a "commercial." Exhibitor members were privileged to offer extra prizes for which they were given a "plug." Admission was free. Selling and order taking was permitted right from the exhibits. Those who put on the "pitch" drew the crowds and presumably the business. It was a carnival in every sense of the word. And it was a huge success. Dealers reported that the show stimulated sales and increased volume for them all through the holiday season.

Next big event of the Bureau of Radio and Electrical Appliances will be its annual winter conference, which is scheduled for Thursday, Jan. 29, at the U. S. Grant Hotel. Like its predecessors, it will start at noon with a luncheon and end that evening, and pack into that incredibly short time some 40 to 50 speakers and participants, in a fast-moving, interest-filled, concise session. A capacity crowd of 500 is expected, among them several national figures in the appliance and radio industry who will be coming West to the San Francisco market, Feb. 2, and fresh from the Chicago market.

First "guinea pig" class was tested at the well-equipped Merritt Evening High in Oakland with actual appliances, loaned

Sales Training Starts in No. California

Bugs taken out in test course so now entire territory to have basic training course beginning in January; product course in the autumn

TIMING is important in selling. For the past two years the situation in northern California has been one of such shortage of appliances and salesmen that no one was interested in sales training. During that period the Northern California Electrical Bureau has made good use of the time to prepare for the program that is being launched with the new year in that territory. Its educational committee, headed by George C. Tenney, editor, ELECTRICAL WEST, and consisting of C. R. Birkholm, Frigidaire Sales Corp.; L. D. Stull, Apex Rotarex Corp.; William Lancaster, Leo J. Meyberg Co.; R. L. Henning, General Electric Supply Corp.; Harold Hugo, Westinghouse Electric Corp., and Walter E. Lind, Pacific Gas and Electric Co., made an analysis of the situation, studied other courses, reviewed sales training course material available, and out of all of this developed the present course.

When it was found that the Gas Appliance Society was planning a similar course, knowing that most dealers in the area sold both gas and electric appliances, the two organizations got together and planned that the first part of the course would be a basic training on salesmanship. As a follow-up, late in the year 1948, the second round will deal with product selling, and then the electric course will be separate from the gas appliance course.

Both committees then selected the material and wrote the outline. It was to be a visio-auditory course, of pictures and sound, with supplementary materials. The Jam Handy "Selling America" course was selected. For the second part, on product, the Edison Electric Institute-National Electrical Wholesalers Assn. course will be used.

Support was enlisted from the State Department of Education. Dr. Ira W. Kibby, chief, Bureau of Business Education, and Hugh M. Blowers, coordinator and regional supervisor of distributive education, developed the final details of the program.

A trial course was set up in Oakland with the cooperation of the Merritt Evening Business School, with Margaret C. Tiffany, coordinator of distributive education, in charge. The course was offered free to dealers and sales personnel. A total of 42 enrolled, 28 of whom finished and were given certificates of completion. They were required to attend four out of the six classes. Afterward 30 of the 42 were personally interviewed at their own places of business to get their personal reactions to the training and thus remove any "bugs" from it. This course started last Oct. 6 and ran six Monday nights to Nov. 10.

In setting up the courses for the entire area, close coordination will be maintained with the local school districts. The completion certificate is arranged for by the State Department of Education and is signed by the district superintendent, school officials and the instructor. To obtain such backing and authority required many conferences with school people. Instructors will be coordinators of distributive education or competent instructors supplied by them. Blowers' office is supplying an instructor for the places where there is no resident district coordinator, a man who will travel the territory.

The schedule includes classes in January through February in San Francisco, San Jose, Sacramento, Stockton, Modesto and Fresno; in February and into March in Bakersfield and Oakland. Another series, covered by Lawson V. Poss, special supervisor, will do "one night stands" on Mondays, Tuesdays, Wednesdays, Thursdays, during January and February, in Berkeley, San Mateo, Hayward and in either Concord, Lafayette, Martinez or Pittsburg in rotation, all in Contra Costa County. Red

Bluff, Napa, Redding and Chico will be reached in March. Palo Alto, Salinas, Monterey and Santa Cruz in April. San Rafael, Santa Rosa and Vallejo in late May and June. Marysville, Auburn, Sacramento and Eureka are likewise on the schedule. Eureka, difficult to reach, will have its course on three nights in one week.

Before the courses began a special two-day conference was given all of the PG and E dealer contact men who also act as secretaries of the local units of the NCEB. These 30 men were given the full course in two packed days, with added instructions by Dr. Kibby and Prof. Blowers to enable them to develop the details of the course with the school officials in their respective towns. These men work with dealers and organize attendance at the classes.

Wholesale distributors salesmen who normally come to San Francisco for sales sessions between Christmas and New Year's were also given a briefing on the course in a one-day preview in San Francisco. These previews were arranged with their companies for several days from Dec. 29 through Jan. 7. This will prepare them to assist the local unit secretaries to enroll dealers and salesmen in the program.

Further publicity will be given the training by means of a brochure, mailed by the local units of NCEB, timed to the course dates in the respective districts.

Next fall the second series will begin. It will take the EEI-NEWA material and cover the electric range, water heater, refrigerator and home laundry in a series of four classes.

Again the National Adequate Wiring Bureau will hold its annual conference immediately after and in conjunction with the annual convention of the National Association of Home Builders, at Stevens Hotel, Chicago, Feb. 22-26. The wiring conference will be Feb. 26-27.

PG and E Retires

Another utility company has retired from direct sale of appliances. Pacific Gas and Electric Co., serving northern California, announced that beginning Jan. 1, it would retire from direct sale of gas and electric appliances.

"We have been gradually withdrawing from direct merchandising for a great many years," said O. R. Doerr, general sales manager. "Our policy declared many years ago, was to pioneer the introduction of new load-building appliances only as long as necessary to establish their acceptance and interest dealers in selling them. Since 1940 we have practically retired from direct sales in all metropolitan areas, selling direct only in those rural areas where our electric business was threatened by LP gas. This is a gradual evolution. It does not mean that we would not sell again if it ever became necessary, but with the large number of dealers today and the aggressive competition of many manufacturers, we feel we can do better for ourselves and the industry by directing our efforts on dealer cooperative activities."

Doerr went on to say that since the war the company had kept its allocations of merchandise from manufacturers formerly supplying it in order to bring the appliances to the area but had turned them over to dealers in most cases to sell. With supplies becoming more plentiful and dealers doing a better job of selling, with manpower available, the company could retire with an assurance that dealers would make a special effort to meet its competition and place appliances on lean rural lines.

Other factors bringing on the decision are that the company has had three years of normal business growth mushroom in one year and its power reserves are very close to the peak demand. With rising costs and an inability to regain revenues from increased volume, economies must be made in order to forestall need for rate increases, which the company is very reluctant to ask for. Retiring from merchandising will effect a number of savings by redirecting manpower, releasing display and storage space and reducing accounting and sales expenses.

LPG Counter-attack

To equip electric appliance dealers with the facts as to comparative costs, sales arguments and considerations in combating liquid petroleum gas competition, the Inland Empire Electrical Dealers Assn., with headquarters in Spokane, has prepared some useful charts, estimate folders and for dealers a bulletin entitled, "LP or KW?" In an accompanying letter, Robert Wilkinson, executive secretary of IEEDA, cites the growth of the liquid gas competition due to shortages of electrical facilities and tells of the joint board of directors' request for a study of comparative cooking and water heating costs. The charts are compiled from electric rates in the Inland Empire region, both those of Washington Water Power and of local PUDs and REAs.

Deepfreeze met with its Western distributors in San Francisco late in November to warm them up on three new models and recharge their sales enthusiasm with a new selling book to the trade, "New World a Coming," which 25,000 dealers and utility people will receive. Sales training, servicing and advertising plans were launched by the Deepfreeze executives below: R. F. Hornish, Seattle district sales manager; F. F. Duggan, dynamic general sales manager; Ben G. Sanderson, Western regional sales manager; S. J. Seibert, product service manager; Charles Volz, Los Angeles district manager; R. V. Newbell, advertising and sales promotion manager; Howard Bede (not shown)

THE DEALER PICTURE

Clockwise around the page, these Northwestern dealers represent a trend:

In Eugene, three Thompson brothers started with a radio laboratory 12 years ago and have outgrown two stores and warehouses. Lack of floor space makes them do most of their selling in the field, with a staff of 30 in sales, maintenance, installation and management. Take a Launderall out for home demonstration on a special trailer; deliver a selection of records to the home for choice; demonstrate home freezing in own homes—things like that. Second picture, one of its salesmen making a complete heating system sale.

Lake City Electric Center illustrates another trend—a complete electric service—wiring, fixtures and appliances—in a fast-growing suburb of Seattle. Its owners are James Duncan, former Puget Sound Power salesman who joined R. D. Thelberg, contractor (extreme right). Beginnings of an electric kitchen in the rear corner; fixture display above the owners.

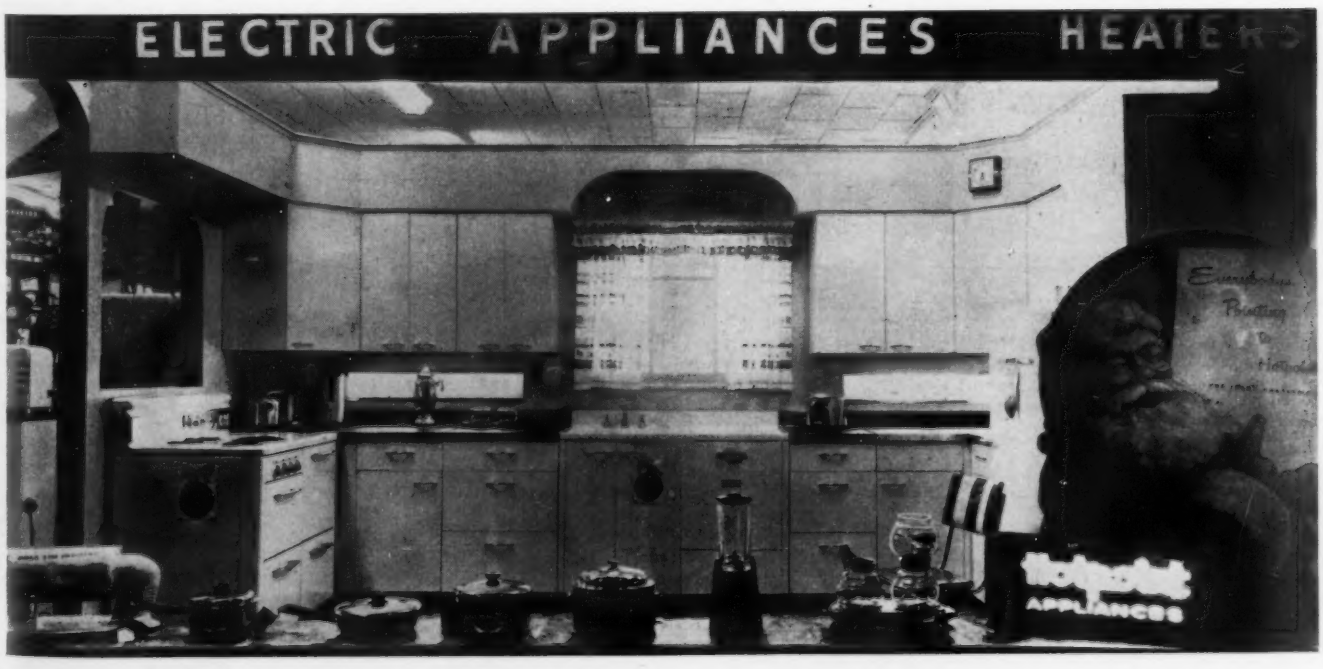
Another combining of talents is found in the ENE Appliance Co. of Portland, named from its partners. Carl Edstrom, who specializes in house heating; Cecil

Naslund (in the picture at right), who is the appliance man, and Bruce Ekman, who handles the radio end of the business.

Miller's Appliance Center, on Roosevelt Way, Seattle, is an expansion into appliances of an automobile and tire dealer (with a sideline of camera stores in Seattle and Portland besides). Owned by Jack Miller, the appliance center was added when a move was made last March to larger quarters. Though in one building, the appliances are in a separate business division, managed by K. L. Smith, who with Jim Kirbach, salesman, is in the picture. The company sells a wide variety of lines.

When a picture of George G. Geddes' Hollywood Electric Co. of Portland was used for the November 1946 cover, it illustrated stretching available merchandise to fill a large new store. Pictures at bottom of these two pages illustrate that merchandise is now here in quantity. It is the same store and has new Hotpoint kitchen which fills one large window. Note the shelf along the window front on which to show small appliances.

Over on the extreme left is a before-Christmas-night picture of the two-story glass front display area of University Electric Co. in Seattle. Located in the college residential suburb, it is run by George R. Mallett, his wife and two sons. Although they sell fixtures they have given up the wiring department and also farm out service work to enable them to handle the entire business without hired help. They own the new building too.



APPLIANCE PREVIEW

F Pin-Up (140)

A fluorescent pin-up light manufactured by Moe Brothers Mfg. Co. may be mounted vertically or horizontally. It is styled by Brooks Stevens; is finished in chromium or bonderized-baked white enamel; uses one 15-watt T-12 F lamp; comes with 6 ft. of cord and plug; operates on a-c only; width 1½ in., length 24¾ in., height 2 in.

Pop-Up Toaster (141)

The new Westinghouse automatic pop-up toaster features a hinged crumb tray, quiet clock and thermostat control for toasting to preselected degree. This model To-71 operates on 110-120 volts, a-c or d-c, at 1,000 watts; comes with permanently attached 3,000-cycle, 6-ft. cord with rubber plug.

Steam Attachment (142)

General Mills is offering a steam ironing attachment for its Tru-Heat iron. It is made of stainless steel and aluminum, is held in place by a hand-operated spring latch. The stainless steel tank holds 1½ cups of water, enough for from 30 to 45 minutes of operation.

Lighting Fixtures (143)

Lightolier Inc. has a new collection of crystal lighting fixtures, including 3-, 5- and 6-light types, hurricane and candle types.

Heat Lamp (144)

A new G-E portable infrared heat lamp may be mounted on a wall by means of a keyhole slot or fastened to a bed or chair with a spring clip; may be tilted to beam its rays in almost any desired direction. It is finished in baked-on brown lacquer and has a Textolite base.

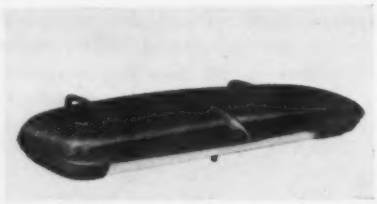
Apartment Range (145)

The new Frigidaire apartment-house-type range, RJ-3, is said to have all the basic features of the larger models. This range is 21 in. wide, 26 15/16 in. deep and 42 in. high. It has three surface cooking units; a one-piece steel cooking top; a full-sized oven has two shelves with nine separate positions; broiler is waist-high; heating units are located at top and bottom.

Fan (146)

A home ventilating fan with an insulated outside door has been announced by Westinghouse. This Poweraire ventilator can move 350 cu. ft. of air per minute. Blades are 10 in. in diameter and are of steel. Extension facilities make the fan adaptable for any wall thickness. This fan operates on a-c only.

F Bed Lamp (147)

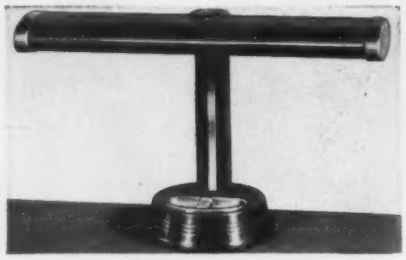


Electro Mfg. Co. is manufacturing the Star Glo fluorescent bed lamp in ivory or walnut plastic. It is available for 110-125 volts, 60 cycles a-c; uses one 8-watt fluorescent bulb.

Knife Sharpener (148)

G-M Laboratories is offering the Surf electric knife sharpener. A pair of polished stainless steel guides preposition the cutting edges of the knife against a motor-driven sharpening wheel at a correct angle. No hand pressure is needed. Excess pressure automatically stops the wheel and prevents gouging the blade. Operates on 60 cycles, 105-120 volts a-c. Listed by Underwriters' Laboratories.

F Desk Lamp (149)



Faries fluorescent desk lamp Model 20,000 is 12¼ in. over-all height, with a base 7¼ x 2 in. in diameter. Finish is electroplated statuary bronze and satin chrome. A special feature is a removable ash tray with cigarette rest which has optional use for pens, clips, etc.

Vacuum Cleaner (150)

A new Premier Model 12 vacuum cleaner has the Matho-Matic nozzle which adjusts itself automatically to the rug pile; a two-speed motor, high for thorough cleaning, low for throw rugs and brush up cleaning; three-way Vibra-Sweep action; accordian top dust bag. It is finished in plastic and polished aluminum.

Clock-Radios (151)

G-E has announced two new clock-radio receivers, Model 60 in rosewood plastic and Model 62 in white urea plastic. They have four tubes, built-in-beam-a-scope antenna, 4-in. Alnico 5 permanent magnet speaker.

Twin Receptacles (152)

Bell Electric Co. has announced its No-Shok twin receptacle, with a snap-back spring action which closes the face when the plug is removed. In addition to safety features, the closed face keeps out dust, dirt, and other foreign objects, the announcement states. Listed by Underwriters' Laboratories.

Single-Dial Washer (153)

Westinghouse is making a single-dial Laundromat automatic washer incorporating in one dial the control of water temperature and washing time. Operations may be repeated or omitted at any time. The new model retains the desk-style cabinet.

Butter Churn (154)

Bernhardt Co. is making Model G electric butter churn, which it states is guaranteed against overheating. A 3- or 5-gal. jar is furnished at additional cost. Gross weight less jar is 14 lb. The churn is for use on a-c current.

Bed Lamp (155)

A bedlamp which is turned on and off by tilting the translucent plastic shade is offered by Hungerford Plastics Corp. This lamp has a 7-watt bulb in each end, either or both of which may be used.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155

Name..... Company*..... Title*.....

Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

PRINT IN BINDING

for SMALL MEALS

or LARGE MEALS

. . no other range offers such versatile

FLEXIBILITY

For Example: Mrs. A has no children, just she and her husband. The built-in surface oven is perfect for most of her meals. The smaller, surface oven saves electricity, and it also saves stooping. Yet, when she entertains, the large regular oven gives her plenty of reserve oven space so everything can be served *hot*.

Mrs. B has a large family. She uses both ovens almost daily. She's never crowded for oven space. Often she needs two baking temperatures simultaneously. She has them! Actually, she wouldn't know how to go back to the inconvenience of having just a single oven.

Yes, indeed, Monarch Roaster Range dealers have the most powerful story to tell in the entire electric range field.

MALLEABLE IRON RANGE COMPANY
3918 Lake St., Beaver Dam, Wis.

No other electric range offers so much practical flexibility! For small-family cooking, the built-in surface oven is perfect for everyday use — complete meals, vegetable dinners, biscuits, etc. Saves stooping, saves electricity. When additional oven space is needed — or when two different baking temperatures are required at the same time — or when you have a broiling operation — your regular, large oven is always ready for instant use. Both ovens are timer-clock controlled. See the Monarch Roaster Range at your Monarch dealer—or write the factory for literature.

MALLEABLE IRON RANGE CO., 618 Lake Street, Beaver Dam, Wisconsin

Monarch ELECTRIC

As advertised in the January issues of BETTER HOMES & GARDENS, AMERICAN HOME, HOUSEHOLD, HOUSE BEAUTIFUL, and HOUSE AND GARDEN.

NWEL & PA Section Meetings

PLACES and dates of three of the four section meetings of the Northwest Electric Light & Power Assn. were confirmed at a meeting of the association's executive committee in Portland, Dec. 19. At the same time the association's Research Advisory Service was set up for continuation another year, according to T. E. Roach, executive vice-president, Idaho Power Co., and president of the association.

First of the section meetings is that of the Engineering and Operation group, which will meet April 14-16 at the Davenport Hotel, Spokane. Lester R. Gamble, Washington Water Power Co., section chairman, reported that his six committees were organized and working on projects outlined at a recent meeting of his executive committee. The meeting will be of the conference type, similar to those held in recent years, and will attract engineers and operating men from the utility companies as well as manufacturer and jobber representatives. E. H. Collins, Washington Water Power Co., has been chosen to be general chairman of arrangements.

Business Development Section, under Howard N. Walters, B. C. Electric Railway Co., chairman, will hold its annual spring conference May 10-12 at the Empress Hotel, Victoria, B. C. The meeting has been scheduled at the fore part of the week to permit visitors to spend the preceding weekend in the delightful vacation area of Vancouver Island. W. C. Mearns, B. C. Electric Railway Co., Victoria, is chairman of arrangements and Drummond Brooks, Northern Electric Co., Vancouver, will head the entertainment committee to be formed from manufacturer and wholesaler members.

Six bureaus and their subcommittees will hold concurrent conferences on one day, while the other two days will be devoted to general sessions of broad industry interest with all branches of the industry taking part. A new bureau established this year among the manufacturer, wholesaler, dealer and contractor representatives, with L. Dean Pulsifer, Westinghouse Electric Supply Corp., Seattle, as chairman, will make its initial bow with its own bureau conference and a portion of the program of the general sessions.

As an innovation this year, the association will hold its annual business meeting on the opening day of the Business Development Section conference.

J. E. Winton, Washington Water Power Co., Spokane, chairman of the Accounting and Business Practice Section, announced the dates of his annual section conference as April 17 and 18 at the Davenport Hotel, Spokane. The section's reactivated executive committee will hold a planning meeting early in 1948 to set up the program.

Dates for the meeting of the Personnel Section have not yet been set, according to O. A. Petersen, B. C. Electric Railway Co., section chairman. Plans are on foot to combine the annual section conference and a one-day meeting for safety and accident prevention supervisors the latter part of May or early in June. The section has six committees active in studies of various phases of personnel work.

The Northwest Research Advisory Service, which has now been in operation under the auspices of the association for the past 20 months, has been set up for another year under the direction of Ladner Ross. This service provides answers to production, marketing, accounting and similar problems of industrialists and commercial establishments among the customers of seven of the larger companies in the association area. Contact for the answers to these problems is maintained with a wide variety of research laboratories in government, industry, colleges and trade associations. The service now has a library of several hundred reports covering problems submitted from woodworking, mining, ceramics, metal working, agriculture and other industries prevalent in the association's territory.

RMEL Adds to Staff

To further the Go All Electric program throughout the entire Rocky Mountain Electrical League territory, Joe Wright, former lighting and educational specialist for Public Service Co. of Colorado has been added to the staff of RMEL. He will devote his entire time among dealers and utilities in the area to assist in the promotion of the program. Aim of the program is to increase merchandise and electricity sales in the rural areas particularly and combat inroads made by bottled gas.

RMEL is using the NEMA basic program, adapted to the area. The Arthur G. Rippey & Co. advertising agency has been retained as advertising and sales promotional agency. Wright, as field representative, will specialize on this phase of the association's over-all program, according to Ralph Hubbard, manager of RMEL.

Quick Catch-up

IAEI

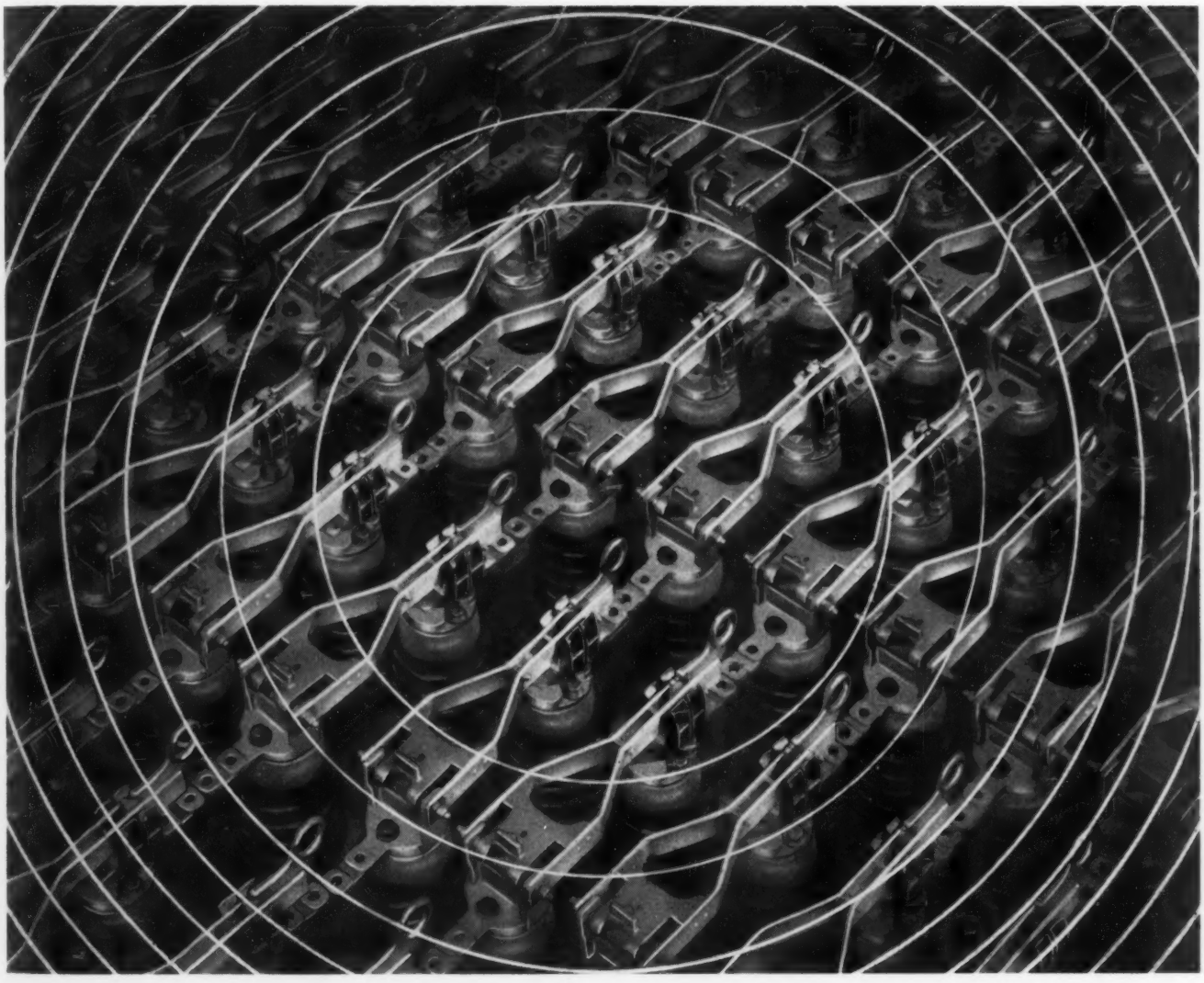
Prefabricated houses, built in panels of plywood, were considered by the *Southern California Chapter, International Association of Electrical Inspectors,* which visited the plant in which they are made, at its last meeting, in November, at Burbank. Grover W. Taylor, General Panel Corp., explained that wiring, in armored cable or flexible metal conduit, is installed by a licensed electrical contractor at the factory; that connections between panels are made during erection by a contractor and inspected by the inspector. After some discussion a committee was appointed to find some means for inspection of wiring during panel construction to make the houses acceptable throughout southern California. Other topics of interest covered were: a bill to permit registration of engineers; Christmas street decorations; hazards of use of aluminum poles in walnut groves to shake down walnuts but which may contact high-voltage lines; Article 430 changes as recommended. Charles Donahue was elected chairman for next year, succeeding Kenneth Howard, South Gate; E. V. Muller, re-elected secretary, and San Diego chosen for the next meeting, Jan. 28.

Last meeting of the *Central California Chapter, IAEI* decided that the next meeting would be held in Fresno, at the Memorial Auditorium, Feb. 6, presided over by L. B. Sterling, Fresno city inspector. J. R. Lazarus, PCEA, is to discuss the uniform electric code.

How electric heaters are tested by Underwriters' Laboratories was explained and demonstrated by J. A. MacNabb and H. B. Cavanaugh at the Dec. 6 meeting of the *Northern California Chapter, IAEI,* at San Jose. R. A. Maxwell, San Jose inspector, completed his successful terms as chairman and J. L. Ambrosi, Oakland inspector, was elected chairman for 1948; Walter Keller, Santa Cruz inspector, vice-chairman, and M. Kennedy Bliss, Board of Fire Underwriters of the Pacific, secretary-treasurer. Westinghouse presented a movie on radio-frequency

Cole Electric Co.

8439 Steller Drive TExas 0-3243 Culver City, Calif.



Hook Stick Disconnecting Switch
Type Y2, 7,500 Volts, 400 Amperes
Single Pole, Single Throw

heating; a recommendation was made both to the California Division of Industrial Safety and to the IAEI executive council that service switches be required to be at least 24 in. from the floor. Next meeting will be in San Mateo on Feb. 21. Southwestern Section President Harry Moore invited the chapter to a joint meeting with the Central California Chapter in Modesto in April.

Electric Clubs

D. O. Bergey, Pacific Power & Light, was nominated for president of the *Portland Electric Club* to succeed R. D. Hyneman. Nominations were made at the Nov. 20 meeting at which George Bragg, vice-president of that company, analyzed the power situation in the area from the report of the Northwest Power Pool. Other nominations included: R. H. Sroufe, Westinghouse Electric Supply Co., first vice-president; G. B. Bocarde, PP&L, second vice-president; Leonard Kallen, secretary; John D. Webster, PP&L, treasurer; F. E. Webb, sergeant-at-arms, and in addition to the officers, as directors, Lowell C. Stewart, Bonneville Power Administration; Robert Temple, General Electric Co.

Contractors

Idaho Electrical Contractors Assn. has been polling its members to see if they wish an annual convention early in 1948, possibly late January or early February. It would be a two-day affair, probably in Boise. The association also announced that the state had engaged a field man to assist in the licensing of journeymen wiremen and electrical contractors according to the state electrical code. After Jan. 1 no licenses will be issued without examinations.

San Francisco Electrical Contractors Assn. has been preparing to sue the city of San Francisco for a return of license fees paid by its members in compliance with its ordinance which also required examinations before licenses could be issued. Since the Howarth case in Fresno, which set aside examinations by individual cities, San Francisco has not required examinations and has granted licenses, so the association alleges, without the accompanying fee. The association maintains that the city should conduct examinations or return the fee previously paid.

Northern California Chapter, National Electrical Contractors Assn., held chapter branch elections in December. Elected were: *Alameda County branch*, W. S. Bassett, Conrad Electric Co., chairman; A. L. Souza, Broadmoor Electric, vice-chairman; J. R. Havens, Havens & Wade, secretary; *Contra Costa branch*, George Hansen, Service Electric, chairman; Cyrus Hegstrom, vice-chairman; Fred Poinelli, secretary; *Santa Cruz-Watsonville branch*, Cecil Searle, Santa Cruz Electric, chairman; L. W. Johnson, vice-chairman; Bruce E. Hoque, secretary; *Fresno branch*, W. E. Ochinero, Acme Electric, chairman; R. F. Simmerley, Industrial Electric Supply, vice-chairman; F. S. Caglia, Electric Motor Shop, secretary.

Rocky Mountain Chapter, NECA, has one of the most constructive and beneficial programs of any contractors' organization in the West. Working closely with the Rocky Mountain Electrical League, the dealers' and builders' department of the Public Service Co. of Colorado, and its local union No. 68, IBEW, it has recently finished an electronics training course, participated in Denver's Home Show with an Adequate Wiring exhibit. It plans a ladies' auxiliary for wives of its members. Regular meetings are held each month both in Denver and Cheyenne. And its enterprising manager, Don Larson, issues a breezy informative bulletin each month. Its electronics course deserves a full story, which will appear in a later issue.

Several members of Western chapters of the *National Association of Refrigerator Contractors* are planning to attend the annual meeting of the association in conjunction with the fifth annual refrigeration and air conditioning exposition at Cleveland, Jan. 26-29. Jan. 27 will be the contractors special day. Gerald W. Weston, executive vice-president of the association, has resigned to go to Los Angeles, and Joe Helminak of Cleveland takes his place . . . The Los Angeles association has submitted to the Building and Safety Commission a draft of a licensing and regulating ordinance, which the commission has sent to the city council for passage.

"Hot Potato" Tossed Back

The vacation-with-pay plan is back — a still unsolved riddle. When the committees of the Alameda and Contra Costa branches of the Northern California Chapter, National Electrical Contractors Assn., and Locals 595 and 302, International Brotherhood of Electrical Workers, had failed to reach any agreement as to how a vacation-with-pay plan could be made to work legally or with fairness, the matter was referred to the presidents of the two organizations, R. W. McChesney, president of NECA, and Dan Tracy, president of IBEW, whose decision, according to the addenda to the agreement, was to be final. It went back on Nov. 1.

The decision was received by the Northern California Chapter, NECA, on Dec. 26. It was dated Dec. 19, and signed by Tracy and McChesney. This was the "decision":

"Because of action taken at the 1947 convention of the National Electrical Contractors Convention, its president finds himself unable to agree upon any plan for pooled vacations with pay. Accordingly, the arbitrators, after a series of unsuccessful conferences, have decided to return the case to the parties involved."

NISA

New Chapter charters have been granted by the *National Industrial Service Assn.*, the motor shop organization, to Seattle, Portland, Los Angeles and San Diego. New chapters were organized as a result of the visit to the West of President Seldon High, and others and of meetings with motor dealers in these cities. Chapters already existed in Vancouver, B. C., and the San Francisco Bay region. NISA has just announced the completion of Section 1 of the Rewind Data Book, available to its members. It covers motors from ½ to 10 hp. at four speeds.

IES

Beth McCrone, former member of the Northern California Section, *Illuminating Engineering Society*, now at General Electric Co., Nela Park, Cleveland, gave the section the benefit of her acute observations as to lighting design trends and practices in France, England and Holland, as the feature of a homecoming meeting, Dec. 16, at The Officers' Club, Treasure Island. Miss McCrone early in 1947 visited Europe with her mother, and while there contacted lighting companies, designers, manufacturers etc. to observe new ideas and trends. At the time she was home lighting consultant for Pacific Gas and Electric Co., San Francisco.

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Board members to serve under Prof. Gordon R. Shuck, recently elected chairman of the *Washington State Chapter*, are: Earle D. Gilpin, Elmer Favro and B. T. Heinz. K. E. Hollingsworth is secretary-treasurer.

Joint meeting of the *Oregon Chapter* with the American Institute of Electrical Engineers featured F. D. Crowther, manager of sales, lighting sales section, apparatus division of General Electric Co., Schenectady, and Walter Potter, district manager of the Portland G-E lamp department, who discussed *Relationship of the Illuminating Engineer in Electrical Engineering* . . . Dr. Darell B. Harmon, fellow of the IES, spoke on *Light for the Growing Child* at the December 16 meeting.

AIEE

Pacific General Meeting in Spokane of the AIEE is scheduled for Aug. 24-27, 1948.

NEMA

The Third International Lighting Exposition and Conference will be held in the spring of 1949 at the Stevens Hotel in Chicago, according to an announcement made at the close of the Second International Exposition, which was sponsored by the Industrial and Commercial Lighting Equipment Section of the NEMA.

At the *21st annual meeting* of the NEMA William C. Johnson (see ELECTRICAL WEST, December 1947, p. 126) was elected president succeeding R. Stafford Edwards, president of Edwards and Co. Inc., Norwalk, Conn. Johnson is executive vice-president in charge of the general machinery division of Allis-Chalmers Mfg. Co., Milwaukee. He has served NEMA as a member of its board of governors and as vice-president since 1944.

EMEA

Second Annual Industrial Electrical Show sponsored by EMEA is scheduled for March 18-20, 1948 at the Los Angeles Armory.

In southern California members heard Bob Randal, planning sound engineer, Gough Industries, speak on *Sound in Industry*.

Northern California meeting in San Francisco featured L. E. Swindell, engineer of the Electric Storage Battery Co., service division, San Francisco office, who discussed general features, care and maintenance of storage batteries.

"The fate of the world sits on this rug"

– JOHN L. LEWIS

NOTE: Paste this editorial in your hat. Re-read it as you start to shiver the next time John L. Lewis cuts off the nation's coal supply.

"Labor monopoly" will mean much more to you then. But if you are worried enough you will get after your Congressman to do his part now — before the shivering starts.

★ ★ ★

"The fate of the world sits on this rug."

The men on the rug: John L. Lewis, President of the United Mine Workers, who made the remark; Benjamin Fairless, President, United States Steel Corporation; George M. Humphrey, Chairman, Pittsburgh Consolidation Coal Company; Harry M. Moses, President, H. C. Frick Coke Company; Charles O'Neill, President, United Eastern Coal Sales Corporation; the late John O'Leary, International Vice President of the United Mine Workers; and John Owens, President, District No. 6 United Mine Workers.

The place: Room 800, Carlton Hotel, Washington, D. C.

The time: Last July during the "negotiation" of a new soft coal contract.

The outcome: Another whopping increase in wages and the price of coal, another hike in the cost of living, and a "contract" which binds the United Mine Workers only as long as they are "willing and able to work."

Mr. Lewis was right. The fate of the world did sit on the rug. In fact, it sat at Mr. Lewis' feet, for, as this editorial will explain and as the outcome shows, his power over coal is absolute.

Without coal modern industrial civilization collapses. Without Mr. Lewis' assent coal can not be mined. He has the nation and, in the years 1947-48, the world at his mercy.

The Taft-Hartley Act, good as it is, does nothing to check this kind of monopoly.

I

The Taft-Hartley Act fails to protect the public in many major particulars.

Here are some of them.

1. Labor monopoly is promoted and protected by its continued exemption from the federal antitrust laws. Management has no such exemption and should not have.

2. Industry-wide bargaining, a kind of second-degree monopoly, is left virtually undisturbed. So is union-wide bargaining which extends the power of national unions far beyond a single industry.

3. Featherbedding, the art of getting paid for doing nothing, is left largely intact.

4. The menace of having local utility strikes wreck the health and safety of a community is left untouched. Postponement and persuasion are the only instruments provided to deal with strikes that would wreck the nation.

My purpose in citing these omissions from the Taft-Hartley Act is not to belittle the act or its framers. They did a most courageous and constructive job. They made a real start toward restoring a workable balance in industrial relations in the United States, so far as the law can do it. But they have not completed the job. Among their omissions the two discussed in the next sections of this editorial stand out above all others.

II

The most serious Taft-Hartley shortcoming is its failure to deal with labor monopoly.

Labor monopoly exists wherever a union is so strong that bargaining becomes a sham and the union virtually dictates its own terms.

If an employer or group of employers secures a monopoly or anything approaching a monopoly, prosecution for violation of the federal antitrust laws

is in order. That is as it should be, for monopoly means death to economic and political freedom.

But if a labor union secures complete monopoly control over an industry through control of its workers, that union remains above and beyond the antitrust laws. "The fate of the world sits on this rug." By that imperial attitude John L. Lewis fully demonstrated how obsolete is the notion that labor unions are weak and, therefore, need exemption from the antitrust laws. Through the United Mine Workers, Mr. Lewis controls about 90% of the coal miners. (No company controls more than 5% of the nation's coal output.) Wherever he sits he has at his feet the welfare of the whole nation.

Great international unions exercise a comparable measure of monopoly control in other basic industries—steel, transportation, and automobiles, for example.

These labor monopolies can destroy the nation if they are not themselves broken up. Witness the plight of France. There the Communists have found in the great labor monopolies an instrument for shaking the nation to its foundations.

III

The Taft-Hartley Act also leaves untouched industry-wide collective bargaining, which is a kind of second-degree monopoly.

When all or almost all of the employers in an industry get together with the union leaders to agree on wages and working conditions (that is called industry-wide bargaining) they set up a monopoly control. It is a less concentrated monopoly than when the terms are dictated by either side, as Lewis dictates them in coal. But, nonetheless, competition is eliminated and monopoly control is established over wages, which are by far the largest element in the cost of production. It follows that public regulation of collective bargaining—*which means the end of free unions and free management*—is not far behind.

Some employers defend industry-wide bargaining as their only defense against industry-wide unions. Other employers like it because it makes wages and hours uniform for their whole industry.

For those employers who are forced into industry-wide bargaining in self-defense the road to relief is clear. Congress owes it to them and to the public to free them from the necessity of dealing with a monopolistic union. The best way to do that is to remove the exemption of labor unions from the federal antitrust laws.

To those employers who engage in industry-wide bargaining because they like it the proper answer is also quite clear. They (and the union involved) are maintaining a private monopoly which is offensive to the public interest. It should be prevented by law.

IV

Congress should finish the job of eliminating labor monopoly and industry-wide bargaining.

In the course of enacting the Taft-Hartley law last spring the House acted to eliminate the exemption of unions from the federal antitrust laws and to make industry-wide bargaining illegal. The Senate, however, refused to go along.

The principal reason advanced in the Senate for deferring action was that more knowledge is required to legislate intelligently. To get the needed information, a joint Congressional committee was created.

It is standard Congressional practice to stall off tackling a difficult job by creating a special committee to study it. The new joint committee is not likely to prove an exception to this rule—*unless the voters loudly demand of Congress that it get on with its job of protecting the public interest in the conduct of labor relations—a job which is nowhere near done.*

Helpful and effective as many of its provisions are, the Taft-Hartley Act does not face squarely the central principle of industrial relations in a free society. That principle is this: *Neither employers nor organized workers, separately or in combination, shall exploit the public by establishing a monopoly.*

Do not let your Congressmen go to sleep on the job of solving that problem or hide from it because of fear. The perfect solution may be hard to find. But the problem can be largely solved by making organized labor subject to the federal antitrust laws just as management is now subject to them. If that problem goes by default your children and your grandchildren will really know what slave labor means.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

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WHY EXECUTIVE BACKING IS VITAL

Employees still want the benefits of the Payroll Savings Plan. In fact, they *need* the P. S. P., because banks don't sell Bonds on the "installment plan"—which is the way most workers prefer to buy them. But wartime emotional appeals are gone. Human nature being what it is, the success of the Plan in your company is liable to dwindle unless a responsible executive keeps it *advertised*. The *reasons* for promoting it are as important as ever—to you, your company, and your country.

So—today—*check up* on the status of the Payroll Savings Plan in your company. *Act* on your responsibility to see that it is vigorously maintained.

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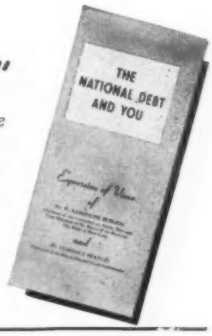

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ELECTRICAL WEST

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THE MONTH IN BRIEF

New Alcoa Plant for Northwest

Plans for construction of a new plant at Vancouver, Wash., were announced last month by Aluminum Company of America. According to C. S. Thayer, works manager of the company's Vancouver operations, the plant will manufacture aluminum wire and rod products and screw machine stock. Aluminum cable with steel core is expected to be a product of the mill, and Thayer is quoted as stating that he hoped some manufacturer would set up a plant to make the required core wire.

Kaiser to Locate Plants in Washington

The Northwest was assured of two other plants last month, when Henry J. Kaiser selected Trentwood, Wash., as the site of a factory for aluminum wire production and Spokane as the site of an aluminum foil operation. A Kaiser bid on a German aluminum foil plant has been approved by the State Department and Kaiser representatives have gone to Germany to supervise dismantling and moving of the plant. Purchase, transportation, import duty and installation are expected to cost about $1,000,000. The aluminum foil will be used in capacitors, electronic and refrigeration equipment. Operation of all three plants will depend on availability of power.

Board Appointed to Study Acquisition

Seattle city council has passed an ordinance officially setting up a board to survey the proposed acquisition by City Light of Puget Sound Power & Light Co. properties in the Seattle competitive area. A $60,000 appropriation was approved for services of the board, which includes Carl D. Pollock, Seattle consulting engineer, and the Ford-Bacon-Davis Co. Included in the study will be acquisition of the company's hydro plants on the White and Snoqualmie rivers. City Light Superintendent E. R. Hoffman said that the utility cannot handle the load of both systems with its present facilities or with developments planned on its Skagit River project. To take care of the combined loads, he said, City Light would have to purchase from Bonneville or other sources energy ranging from 224,000 kw. in 1948 to a maximum of 362,000 kw. in 1952 and decreasing to 159,000 kw. in 1956. The White River and Snoqualmie plants can provide a maximum of 62,000 and 20,300 kw. respectively, only about half of the new load City Light would take over with the Puget Power distribution system, he pointed out.

PG and E Starts Tunnel Project

Pacific Gas and Electric Co. last month started preliminary work on a giant tunnel project in its $61,800,000 Feather River hydroelectric development. T. E. Connolly Inc. of San Francisco holds the contract for 17,800 ft. of 26-ft. horseshoe tunnel, all of which will be driven through solid granite. The tunnel will feed Feather River water into the penstocks serving the company's proposed new Cresta hydro plant, eight miles downstream from Bucks Creek power house. Cresta plant, scheduled for completion in 1949, will have a capacity of 101,000 hp.

Phosphorus Plant for Idaho

Idaho Power Co. will furnish power for production of elemental phosphorus from phosphate found in deposits in Idaho controlled by the J. R. Simplot Co. The company is presently producing fertilizer. Elemental phosphorus, chemical product from which is made a new greaseless cleansing agent, is produced in electrical furnaces. It is expected that the first cost of the plant will be around $5 million, with eventual cost running to $40 million.

New Coulee Generators

USBR has announced plans to install three 108,000-kw. generators in the Coulee Dam east power house during 1950. With three already on order and scheduled for operation in 1949, by 1950 east and west plants together will have a rated capacity of 1,640,000 kw. Contracts for generators and turbines will specify that progress payments on construction will be contingent upon approval of funds by Congress. No payments could be made during fiscal 1948.

Curtailment May Be Necessary

In anticipation of an all-time high peak of 63,000 kw. this December, President Z. E. Merrill of Mountain States Power Co. has warned that reduction of non-essential loads and operation of other loads at off-peak hours may be necessary during the coming year. Supplementing some $3,200,000 spent on new construction and strengthening its system since V-J day, contracts have been signed to help relieve the situation for the company. Included is a total of 21,000 kw. from the Bonneville Power Administration, 1,800 from Willamette National Lumber Co., and 3,000 kw. from Santiam Lumber Co. upon completion of its plant at Sweet Home, Ore.

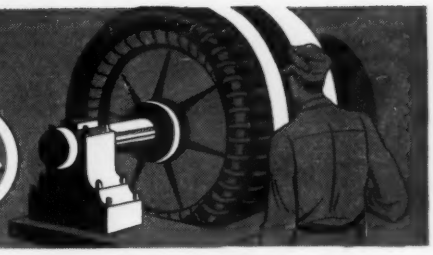
Water Users To Up Rate

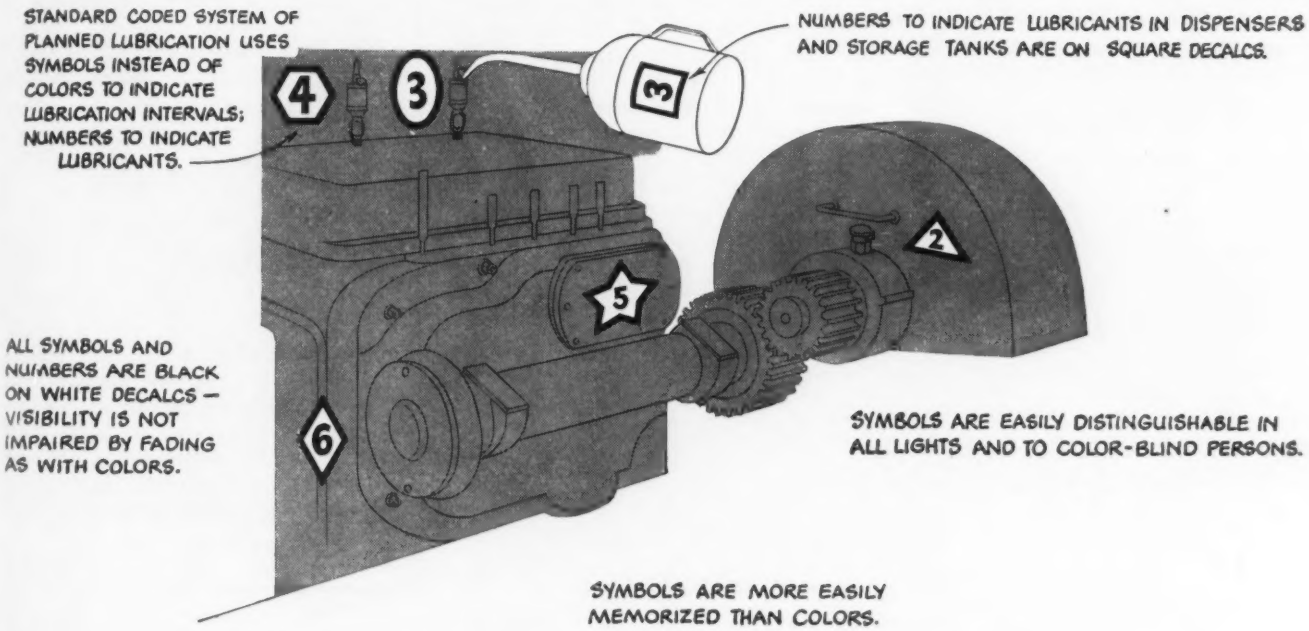
Power rate increases for larger agricultural users of the Salt River Valley Water Users Assn. in central Arizona were expected to go into effect Jan. 1, 1948, according to O. L. Norman, general manager. Survey now underway, following a recent $10 an acre water assessment—highest in the history of the project—indicates that in some cases the present rate is below the cost of production even before a charge for service and distribution is added. Low storage in the association's chain of reservoirs following a 7-year "drought" is partially responsible for high production costs of generating electricity at diesel and steam plants.

A. Emory Wishon who had retired June 30 as vice-president and general manager of Pacific Gas and Electric Co. and was acting as executive vice-president in charge of the company's construction program, died at his home in Danville, Calif., Jan. 4, at age 65 of heart attack. Details of his career will be found in next issue.

STANDARD ENGINEERS NOTEBOOK

CALOL RPM

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THIS MONTH'S NEWS

OREGON COURT VOIDS PUD AGREEMENT WITH REA

An agreement whereby the Union County (Ore.) PUD would be operated in accordance with REA standards by an REA approved manager in consideration of a loan for extension of the system was recently ruled void by the Oregon supreme court. In its decision the court said: "It was not contemplated by the peoples utility district law that the district could transfer the management, responsibility and control over an electric system to another agency." Such a transfer, the court held, constitutes a "complete surrender or abdication by the district of its statutory authority." Use of revenues from a bond sale for acquiring property of the California Pacific Utilities by the PUD was upheld by the court.

Co-op Franchise Voted Down at Salem, Oregon

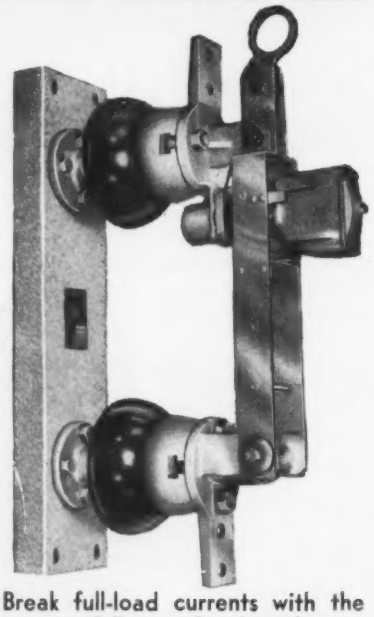
An ordinance granting a general franchise to Salem Electric Cooperative was defeated by the Salem, Ore., city council, which voted for a limited franchise confining the co-op's activities to the area now served.

The limited franchise requires payment of 3½% of gross receipts and contains a provision for termination on 90 day's notice. The general franchise requested by the co-op was for five years and required a 3% payment. Harry B. Reed, Salem Electric manager, said that he would recommend rejection by the co-op of the limited franchise.

Salem voters in two elections voted down proposals to grant Salem Electric a general franchise. Salem is served by Portland General Electric Co.

● Mountain States Power Co. has applied to FPC for authority to issue $5,500,000 of 3% first mortgage bonds due July 1, 1975, $5,500,000 of 2½% secured promissory notes and 22,000 shares of 5% cumulative preferred stock with a par value of $50 per share. All the proposed bonds would be deposited as collateral for the secured promissory notes which would be issued at various dates during the period from Dec. 1, 1947 to Dec. 31, 1950.

S & C LOAD INTERRUPTERS



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WRITE FOR BULLETINS NO. 1 & 6

TRICO FUSE MFG. CO. Milwaukee, Wisconsin

● RECENT approval of a 20-year franchise for the Pacific Power & Light Co. by the city council of Portland, Ore., will be followed by submission of the franchise to the voters at the May 1948 election. Only major change from past agreement is a provision that the public may declare its intention to purchase the utility and proceed with arbitration, condemnation or purchase negotiations at any time during the 20-year period. Heretofore such action was possible only during the last six months of the franchise period. Since expiration of the company's previous franchise it has been operating under a revocable permit.

● PLANS to use "roughly half" of a $1,250,000 issue of first mortgage bonds authorized by the Federal Power Commission to finance power line improvements were revealed by Telluride Power Co. in Salt Lake City. Remainder of the issue will be used to retire some outstanding bonds, combining them into a single issue at a more favorable interest rate. Reinforcement of heavy-duty lines in the Delta-Fillmore-Richfield area, and a new line to serve U. S. Gypsum Co.'s plant at Sigurd, Utah, are among the planned improvements.

● A CALL for bids on revenue bonds to finance purchase of Pacific Power & Light Co. holdings, defray improvements to the system and provide working capital has been made by Clark County (Wash.) PUD commissioners. The commissioners announced that all employees of Pacific Power & Light Co.'s Vancouver branch will be retained "under equal or improved working conditions and rates of pay" after the property is taken over by the PUD under condemnation proceedings.

● SALE of 70 miles of irrigation pumping power lines by Eloy Light and Power Co. to Electrical District No. 5, Pinal County, Ariz., has been approved by the Arizona State Corporation Commission. Sale price of $104,000 included franchise, permits, easements, rights of way and certificates. Request for continuance of an appeal seeking to block the sale on grounds it had a prior option was refused Trico Electrical Cooperative, Inc.

● MODERNIZATION of Seattle's street lighting system through adoption of a two- to three-year program costing at least $3,500,000 will be up to the voters at the municipal elections next March. Program contemplates installation of improved lights on some 300 arterials and semi-arterials, using existing poles in most instances.

● CITIZENS of Washington and Iron counties, in extreme southern Utah, met recently to discuss organization to promote a steam-operated electric plant using local coal as fuel. A committee was named to investigate establishment of a power district and possibility of temporary power from Hoover Dam.

● PUBLIC SERVICE Co. of New Mexico has obtained a new franchise from the town of Deming. The franchise calls for payment to the town of 2% of gross revenue, which town officials estimate will amount to about $2,394 annually.

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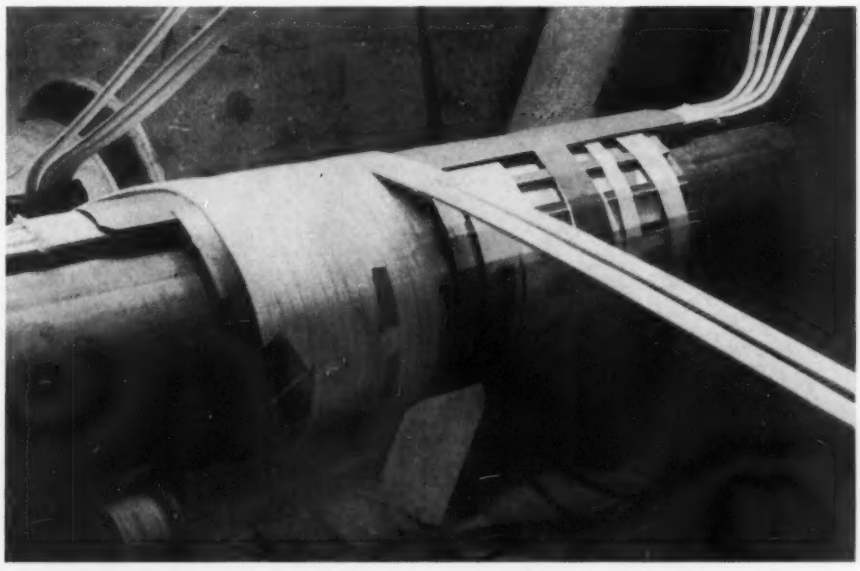

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BOND SALE TO FINANCE IMPROVEMENTS IN ARIZONA

Sale by the Central Arizona Light & Power Co. of $2,500,000 of 3⅛% bonds to finance improvements and expansion has been approved by the Arizona Corporation Commission. Bond sales will be to private insurance companies only.

Of the amount, approximately $2,000,000 will be spent for adding to the company's steam plant and for installation of a 30,000-kw. generating unit to boost plant capacity to 74,000 kw., Henry B. Sargent, company president, reported.

● SEATTLE CITY LIGHT placed orders for $1,145,220 worth of big transformers during November, and is asking for figures for more than $1,000,000 worth of electrical switches for voltages up to 220,000. To keep pace with demand which is increasing approximately 2,700 kw. every two weeks, expenditures of more than $50,000,000 during the next six years are contemplated. In addition to expanding generating facilities and transmission lines, it is planned to increase the height of Ross Dam on the Skagit River.

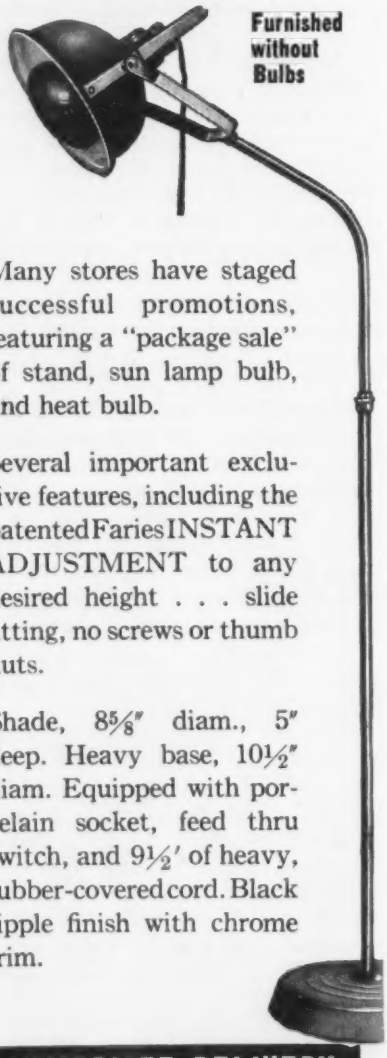
● ON GROUNDS that government-built dams have caused drastic reductions in fish resources of the Pacific Northwest the federal government will be asked to foot the bill for 18 new fish hatcheries in Washington, 11 in Oregon. A six-year program for restoring fish runs for the Columbia River and its tributaries has been worked out by the Oregon fish commission and the Washington director of fisheries, in cooperation with the U. S. Fish and Wild Life Service. Authorization for expenditure of $10,000,000 for hatcheries and stream improvements, plus annual appropriations for operation will be asked of Congress.

● SUPPORTING its contention that it does not export power, but merely delivers it to the international boundary, Arizona Edison Co. received Federal Power Commission approval to continue supplying Agua Prieta and Naco, Sonora, Mex. Earlier reports were that the export was interstate service, regulations of which Arizona Edison was not prepared to meet.

● CAPACITY of the Carlin, Nev., light plant has been doubled with installation of a 300-kw. diesel-driven generator. Installation was made by Power Engineering Co., Salt Lake City, with H. Hassell as consulting engineer.

1 Sun Lamp
(for Ultra Violet Bulb)

2 Heat Lamp
(for Infra-red Bulb)



Many stores have staged successful promotions, featuring a "package sale" of stand, sun lamp bulb, and heat bulb.

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Shade, 8⅝" diam., 5" deep. Heavy base, 10½" diam. Equipped with porcelain socket, feed thru switch, and 9½' of heavy, rubber-covered cord. Black ripple finish with chrome trim.

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SEATTLE TURNS DOWN UNION REQUEST

Request of the Electrical Workers' Union that it be recognized as the bargaining agent for several hundred clerical employees of City Light was again refused by the Seattle city council. During a public hearing, Councilman David Levine, finance chairman, reiterated the council policy that clerical workers in all city departments must be paid equal wages, without exception for employees of City Light. Indicating that it will discuss the electrical employees' wage situation after the union has been granted a new contract by the Puget Sound Power & Light Co., the council also rejected the union's request for an hourly wage boost of 25 cents per hour for electrical workers.

● INTERIM increase of five cents an hour has been granted to 6,000 AFL electrical workers in northern California by Pacific Gas and Electric, effective until Feb. 29, 1948. Present working conditions were extended for one year until Jan. 1, 1949, with further wage negotiations scheduled for February. This across-the-board increase does not affect 4,500 CIO Utility Workers' Union members in the nine San Francisco Bay area counties, who are asking a 20-cent-an-hour raise.

● PACIFIC POWER & Light Co. has completed installation of a 10-block ornamental street lighting system in the business area of The Dalles, Ore. Arthur Trasher, assistant general manager of Pacific said the streets are now as well lighted as in any other city in the country having a comparable volume of traffic. An overhead lighting system has been installed in the residential area of the city.

● TWO FLOORS will be added to the Central Arizona Light and Power Co.'s warehouse building in Phoenix, Ariz., to accommodate executive, purchasing, advertising and accounting offices. Construction, which will cost $250,000, will start immediately and be completed by spring, Henry B. Sargent, company president, said. Offices to be moved now are quartered in the company's downtown headquarters.

● RITZVILLE ELECTRIC Co., Ritzville, Wash., has been purchased by Thomas E. Underwood, previously in charge of electrical sales for the war assets administration in Spokane. At one time Underwood was with J. J. Aggutter & Co., Seattle electrical contractors.

● CONTRACT to rebuild 14,000 ft. of Utah Power and Light Co.'s 21,000-ft. Olmstead flume in Provo River canyon has been awarded Morrison-Knudsen Co. of Boise, Idaho. New welded steel pipe of 8 ft. 6 in. inner diameter will carry 445 c.f.s. of Provo River water to the Olmstead generators. This is the final phase of a $630,000 program at the plant.

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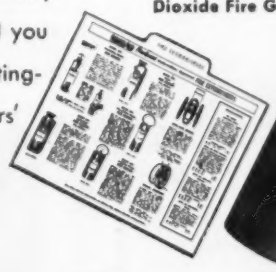

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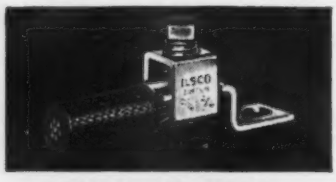

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NEWS ABOUT PEOPLE

● LINE MATERIAL Co. has announced the appointment of GEORGE GAUDEN as field engineer for its Los Angeles territory. He will cover the southern parts of California and Nevada. The company also announced that WILLIAM P. OGILVIE, manager of the San Francisco branch office and local field engineer, has been transferred to Sacramento to serve as field engineer in that territory. He will cover all of the Sacramento and San Joaquin Valley districts, north bay areas in California and north and central Nevada.

● OWEN W. HURD, assistant manager and district engineer for the Bonneville Power Administration at Spokane, Wash., has been appointed manager of the Benton County PUD at Kennewick, Wash., effective Jan. 5. He succeeds J. B. WHITEHEAD of Prosser, who resigned to devote full time to his duties as manager of the Benton Rural Electric Assn.

● HAROLD A. NOBLE, for the last seven years superintendent of the electric production department of the San Diego Gas & Electric Co., has been appointed general superintendent, it was announced by E. D. Sherwin, vice-president in charge of operation. This is a new administrative post created to expedite the company's expansion program.

Noble

Wolfrom

● C. A. WOLFROM retired on Dec. 1 as manager of Utah Power & Light Co.'s Salt Lake division. Wolfrom had had more than 44 years service with the Utah company.

● JAMES C. LITTLEFIELD has been promoted to manager of the Utah Power & Light Co.'s Salt Lake division, according to Roy H. Ashworth, company vice-president. Formerly commercial and industrial sales supervisor, Littlefield succeeds C. A. WOLFROM.

● WALTER L. FRISK is the new manager of Electric Center, a branch of Goldwaters Mercantile Store in Phoenix, Ariz. He has served as merchandising executive of the United-Rexall Drug Store system since 1945. Before joining the army air force, Frisk was district manager and later head of aviation sales of the Pure Oil Co.

● THOMAS B. COPELAND has been appointed manager of Pacific Gas and Electric Co.'s Shasta division, with headquarters at Red Bluff, Calif. He will retain his present duties as division superintendent along with the managership. Copeland succeeds G. R. MILFORD, who retired after 44 years of service with PG and E.

● Two West Coast members of the Institute of Radio Engineers were recently elected to Fellow grade by the board of directors. They are WILLIAM HEWLETT and DAVID PACKARD, both of Hewlett-Packard Co., Palo Alto, Calif.

● F. M. MASON of U. S. Electrical Motors, Inc., Los Angeles, has been advanced to vice-president of the company. He is a member of the motor and generator section.

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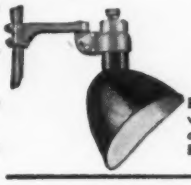

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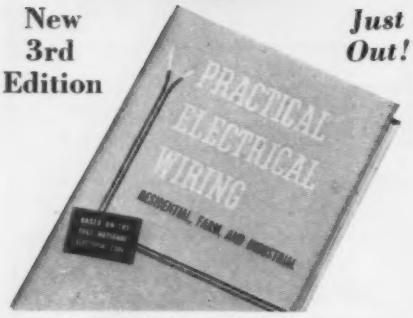

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● JAMES M. McKAY has been named merchandising manager of Graybar Electric Co., Portland. Starting with Portland General Electric Co. in 1930 as merchandise salesman he later became sales promotion manager for the company. In 1945 he served as chairman of the business development section of the Northwest Electric Light & Power Assn.

● HENRY HUDLOW, for the past seven years manager of the Big Bend Electric Cooperative at Ritzville, Wash., has resigned to take over the management of the Franklin County PUD at Pasco, Wash. He is succeeded at Ritzville by ROBERT KLATT, who has been with the cooperative for the last two years as engineer in operations.

● TWO EMPLOYEES of the Washington Water Power Co. of Spokane retired recently. WILFORD F. BOWEN, chief operator at the Post St. substation, retired after 32 years of service, and ELLSWORTH GUMP, senior electrical foreman, retired after 40 years with the company.

● ROBERT H. WILLARD, formerly general counsel for the Bonneville Power Administration at Portland, has been appointed area counsel for the Atomic Energy Commission at Los Alamos, N. M. In his new post he will also serve as assistant general counsel for the entire atomic energy commission.

● THOMAS A. REESE has been added to the staff of Walter M. Boland, Western district manager of the General Electric Co.'s electronics department with headquarters in San Francisco. Reese will serve as inside salesman. He has been with G-E since February.

● HAROLD T. STAPLETON, formerly sales representative with the Allis-Chalmers New Orleans district office, has been named Pacific regional dealer supervisor for the company at San Francisco.

● LEONARD R. ELDER, after 41 years of service, has retired from the General Electric Co., Portland. He had been with the company's Portland apparatus department in a sales capacity since 1909.

● M. P. GOUDY, Idaho Falls electrical superintendent for 15 years, resigned to accept the post of Yuma, Ariz., division manager of Arizona Edison Co.

● WILLIAM A. SOMERS is now with West Electric Products Co., Los Angeles. He was formerly associated with Federal Electric Products, Los Angeles.

Rennewanz

● DONALD W. RENNEWANZ, a native of California and onetime sales manager of Hotpoint's range sales division, has been named manager of that company's Pacific district. He succeeds HOWARD SCAIFE, who has been appointed to the newly created position of manager of market development at Chicago. Rennewanz is a former member of the Pacific Power & Light organization.

● N. H. CALLARD has assumed his new duties as manager of the Hilo Electric Light Co. in Hawaii. For the past 35 years he has been associated with the Westinghouse Electric Corp. on the Pacific Coast and in the east.

Deaths

● AL HIESTER, general manager, T. L. Rosenberg Co., Oakland, died of heart attack while attending the California-Stanford "big game," Nov. 15. Richard Chard has been named by Teo Rosenberg as his successor.

● WILLIS HALL, 63, superintendent of the Ellensburg, Wash., light and water department for 22 years, died recently at McMinnville, Ore. He resigned from the light and water department in 1943.

● HOWARD H. BARROWS, former manager of General Electric's Oakland Lamp Works, died recently. He had served the company in that capacity from 1915 until his retirement last January.

● PAUL GAUNT, state electrical inspector of Seattle, died recently in that city after a brief illness.

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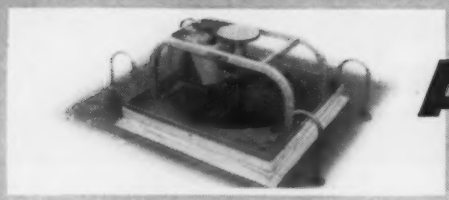

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NOTES ON THE TRADE

Westinghouse Supply Has New San Francisco Quarters

With an increase from 40,000 to 90,000 sq. ft. of space, Westinghouse Electric Supply Co. opened new northern California district headquarters at 201 Potrero St., San Francisco, on Dec. 19, to an open-house gathering of several hundred people. Charles R. Mathews, district manager, and his staff were hosts for the occasion.

What visitors to the new four-story quarters saw was a brilliant lighting installation throughout, spacious office and display space. Also in the building are an auditorium, a coffee shop for employees, loading docks for five trucks and two freight cars inside and the city sales section in an adjoining one-story building on Utah St.

The northern California district has also recently enlarged new branch houses at Fresno and Sacramento and the Oakland house enlarged a year or so ago, giving the Wesco organization greatly increased facilities to stock, warehouse and serve the supplies needed for the area's rapid expansion.

● GEORGE SOMMERS has recently been advanced as Pacific Coast sales manager for all divisions of Sylvania Electric Products Inc., with the single exception of its manufacture of Silvertone radios for Sears Roebuck. Sommers has been sales manager for the lighting division only until this promotion. He now heads electronics sales as well. Meanwhile, William Kennedy, who came West about two years ago as the illuminating engineer for the Pacific Coast region, has been made technical editor of Sylvania's publications and has returned to Salem. No successor has yet been announced. Sommers also announced that construction had started on a new research center and marketing headquarters by Sylvania at Bayside, L. I.

● HAROLD R. BURT, sales and service engineer of Oakland, has been named Western district sales and service representative of the electric motor and refrigeration divisions, Jack & Heintz Precision Industries Inc., Cleveland, Ohio. He will maintain headquarters in Oakland.

● NEW ADDRESS for the HAROLD M. HUDSON Co., Seattle, is 100 New World Life Bldg., 618 Second Ave.

● ICEBERG REFRIGERATED LOCKER SYSTEMS Inc. have appointed the following distributors on the West Coast: Shirar Young Refrigeration Corp., San Francisco; General Refrigeration Service Co., Santa Maria, Calif.; Wilderman Distributing Co., Seattle; Economy Frozen Food Locker Stores, Los Angeles.

● WESTINGHOUSE ELECTRIC SUPPLY Co. has opened its new office building and warehouse at Portland, with Ralph H. Sroufe as manager. The building occupies an entire block in the industrial area of the city, providing approximately 40,000 sq. ft. of floor space for offices, service departments, storage and displays.

● C. P. CLARE & Co. has announced the appointment of Marshank Sales Co., 672 South Lafayette Park Place, Los Angeles, as sales representative for California, Arizona and Nevada. A branch office of the Marshank Sales Co. is located at 1047 Flood Bldg., San Francisco.

● INSULATION AND WIRES Inc., has announced the opening of warehouses in Los Angeles and San Francisco to serve West Coast independent electric motor repair shops, industrial maintenance departments, and manufacturers of electrical equipment.

● LENKURT ELECTRIC Co. has completed the removal of its headquarters and manufacturing activities from San Francisco to a new plant on County Road, San Carlos.

● THE FIRM of WISMER & BECKER, Sacramento, electrical contracting engineers, has been announced as successors to Cates & Wismer. Hugo Becker replaces Mr. Cates in the organization.

● J. G. GOODRICH, 01537 S.W. Comus, Portland, is the newly appointed Northwest district manager for the Clark Water Heater Division of the McGraw Electric Co.

● THE LEE ARTER Co., manufacturers representatives of Los Angeles, has opened a new office in San Francisco. Another office will be set up in Portland by Jan. 1, according to Arter.

● STUBBS ELECTRIC Co., Portland, has been named distributor for Westinghouse lamps in Oregon and southern Washington.

● W. D. HOWZE & Co. has been appointed southern California representative of Smithcraft fluorescent lighting fixtures.

for your convenience

A SEPARATE DIRECTORY

The 16th Annual Manufacturers' Directory will be published in April, 1948 as a separate supplement to the regular April issue of ELECTRICAL WEST.

This means you will have this useful Directory of the Western offices and agents of electrical manufacturers in a more accessible and convenient format than ever before.

All subscribers will receive the Directory with the April issue of ELECTRICAL WEST at no extra charge.

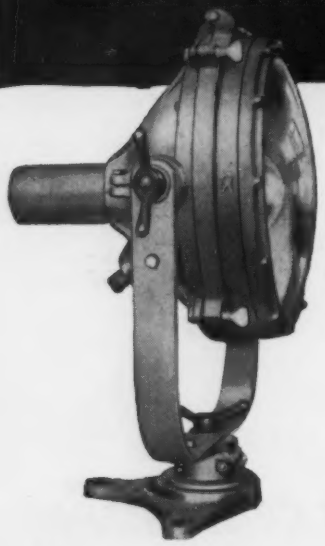
The Directory includes complete and accurate information on the Western offices, agents and facilities of manufacturers of electrical equipment. A listing of appliance parts and service stations is also a part of the Directory.

Advertisements of manufacturers and western sales organizations elaborate on the basic information provided by the Directory and round out its usefulness to the buyer of electrical equipment.

ELECTRICAL WEST

Spokesman for the most highly electrified section of the U. S.

DEPENDABLE
Floodlighting
WITH MINIMUM
MAINTENANCE



Pyle-National heavy duty floodlight equipment is built to withstand severe operating conditions; to provide the reliable lighting needed for protection, and for outdoor night work. Pyle-National reflector design and light control lenses assure high efficiency lighting with proper distribution for maximum usefulness. The wide range of types and sizes, from 100 watts to 2000 watts, allows individual requirements to be met easily and economically—substantial weatherproof construction with sealed interior gives maximum protection to reflector and lamp bulbs. Interior cleaning and other maintenance is greatly reduced. Write for Catalog 2100 giving full information, with beam efficiency, candlepower, and light distribution data.

THE PYLE-NATIONAL COMPANY
1364 N. Kostner Avenue, Chicago 51, Illinois

● Frank Edwards Co., San Francisco, has made three new staff appointments. Bob Watson, formerly with the San Joaquin division of Pacific Gas & Electric Co., will handle the San Joaquin territory. Howard Eldridge, previously with the Coast Counties Gas & Electric Co., has been named east bay and northern California representative. Dave Reid, former sales manager of the Stockton division of the Pacific Gas & Electric Co., will handle the San Francisco and north and south coast areas.

● Allen & Olsen Mfg. Co., Venice, Calif., has chosen W. A. "Bill" McGuire to represent the company in southern California and Arizona. Formerly lighting manager for Graybar at Los Angeles, McGuire will headquarter at 1855 Industrial St., Los Angeles 21. The company has appointed the Meier-Murphy Co., Western Merchandise Mart, 1355 Market St., San Francisco, as its representative in northern California and western Nevada.

● M. B. Squires, manager of the Spang-Chalfant Division, National Supply Co., of Pittsburgh, Pa., was a Western visitor early in December, visiting Western distributors of the company's products. He was given a welcoming dinner by Arthur E. Rowe, the company's San Francisco agent, Dec. 9, at Palace Hotel. A large group of Rowe's friends in the industry attended and discussed business conditions and prospects with him.

● Clarence F. Packard has been named sales manager of the Jackson Distributing Co., Salt Lake City, distributors of Farnsworth products in Utah and sections of Idaho, Nevada, Wyoming and Oregon. For a number of years he was associated with the Utah Power & Light Co.

● Merger of Railway & Industrial Engineering Co. of Greensburg, Pa., with I-T-E Circuit Breaker Co. of Philadelphia was announced recently. No immediate change in the distribution organization of either company is contemplated.

● Leo M. Kerkhof has been made district sales manager for northern California for Trumbull Electric Mfg. Co., with headquarters at San Francisco.

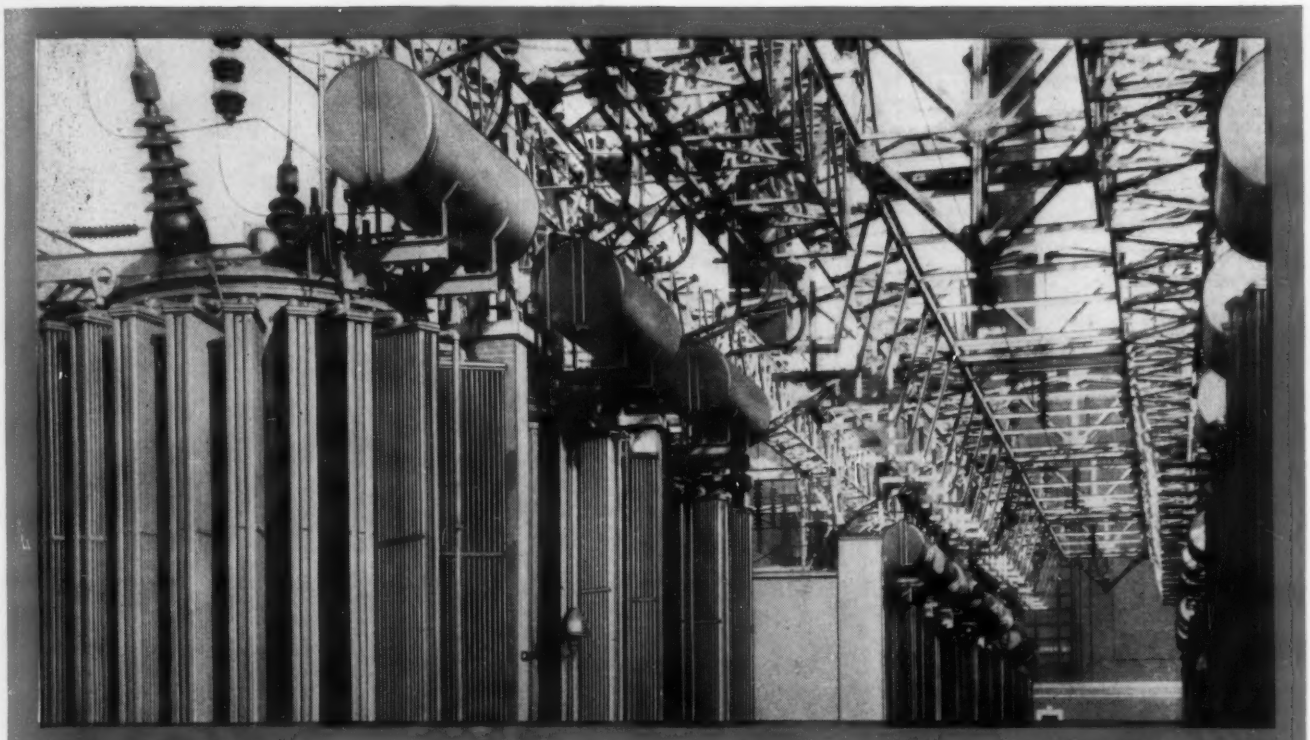
● G. S. Electric Sales & Service Ltd. has become incorporated with registered offices at Vancouver, B. C.

● Leonard Hobbs, vice-president and general manager of Smoot-Holman Co., Inglewood, was re-elected secretary of the RLM Standards Institute at its annual meeting in November. Hobbs is the first Westerner to be an officer of RLM. He is also active in the Fleur-o-Lier Institute and acted as chairman recently when the latter held a regional meeting in Los Angeles at which G. T. Morrow, chairman of the Fleur-o-Lier advisory board, and vice-president of Curtis Lighting Co., presented the program of the institute to Western fluorescent fixture manufacturers.

On an all electric ship, like the new American President Lines' luxury liner, SS President Cleveland, of course there are electric blankets too. C. J. Hill, blanket man for General Electric, San Francisco, shows Capt. Henry Nelson how the control works. G-E furnished power equipment that drives the President liner

Hobbs

Picture This for Service!



★ DEPENDABLE PROTECTION SINCE 1923 ★

No Moving Parts . . . No Maintenance . . . No Replacement Gas . . . No Bottles to Buy. . . IN 24 YEARS, with Allis-Chalmers *Original* "OIL-SEALED" Inert Gas Systems!

YES, 24 YEARS AGO we built these 18 transformers, totaling 270,000 kva, for a big eastern Utility . . . and equipped them with the *first* "Oil-Sealed" Inert Gas Systems. Today this system is standard for over 5,000,000 kva of U. S. power! What does this pioneering mean to you?

For one thing, when you specify *Allis-Chalmers* "Oil-Sealed" inert gas you buy the *original* system . . . benefit from the longest experience in this field! And you get added advantages over any other type of system:

LOWEST-PRESSURE OPERATION — generally not over 1 lb per square inch. Less pressure on gaskets means lower gasket maintenance.

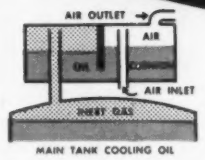
LOWER MAINTENANCE — simple design eliminates sensitive gauges and reduction valves. Periodic replenishment of nitrogen is not required . . . there are no bottles to buy.

YOUR CHOICE OF LOCATION — system may be mounted on top of tank, or on side. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

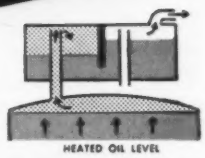
A 2353

"Oil-Sealed" is an Allis-Chalmers Trademark

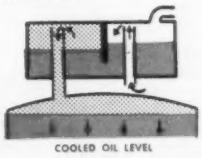
SIMPLE AS A·B·C



A PRINCIPLE — Transformer cooling oil is isolated from the atmosphere by inert gas and oil seal. This prevents sludge formation and fire hazard due to oxygen. Excluding moisture maintains high dielectric quality of oil.



B AS TRANSFORMER HEATS, the cooling oil expands, displacing inert gas from main tank to auxiliary tank. The transfer of gas is cushioned by the change of oil levels as shown, keeping the main tank pressure low.



C AS TRANSFORMER COOLS, the reverse takes place. In this simple manner inert-gas protection is provided automatically . . . transformer oil adjusts itself to changing temperatures without being exposed to the atmosphere.

ALLIS-CHALMERS

Originators of the "Oil-Sealed" Inert Gas System!

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PROFILES

Roy H. Ashworth (right) has been promoted to vice-president by Utah Power & Light Co. Ashworth has been with the company for more than 34 years, was commercial manager before his recent promotion. He is an electrical engineering graduate of the University of Minnesota and started his career in Utah Power & Light's statistical department, was assistant to general manager, then general manager

Instead of a turkey, J. S. NePage, of Carlson Electric, won a white rabbit at Electric Club of Washington's pre-Thanksgiving turkey drawing At head table, dimly seen, was "Curley" Hepler, L. C. McIver, who was MC for the day, Tom Widrig and Henry Kruse

The four Hawaiian Electric Co. men below were pictured in front of the company's Honolulu office before taking off by plane for the PCEA conference at Fresno, Calif. They are Emil Olson, manager generation department; William J. Froome, electrical engineer; Virgil Nahl, retail major appliance sales supervisor, and Eugene A. Helbush, internal auditor, all of the Honolulu organization

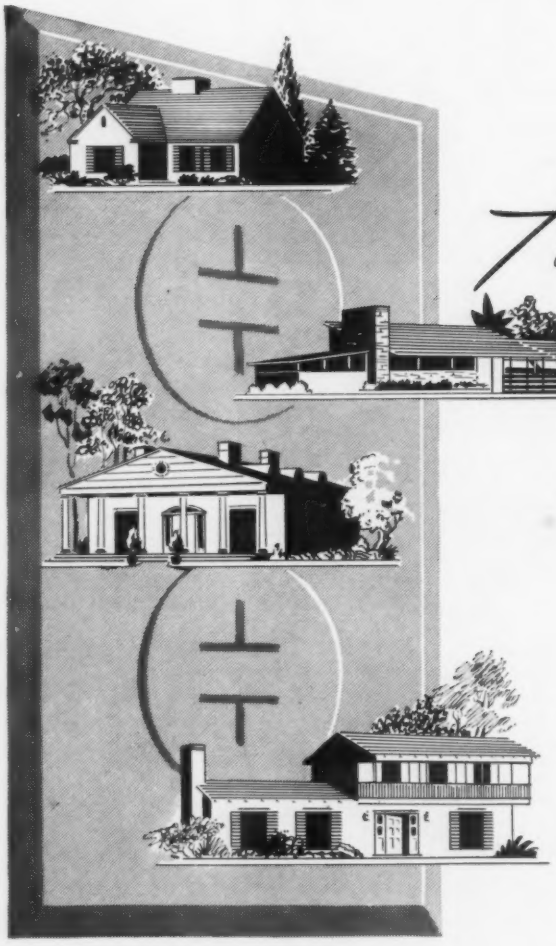
Corralling a Million HORSEPOWER

Vital units serving you in our vast, interconnected electric system are the substations, where an endless stampede of untamed horsepower surges down from the high lines at 220,000 volts. "Stepped down" by giant transformers, the power is distributed at 120 to 2400 volts—to factories, farms and homes and goes to work in a thousand and one ways.

As part of our $350,000,000 construction program, we are spending $60,000,000 for the construction and improvement of substations that will corral the 1,000,000 additional horsepower destined for distribution throughout Northern and Central California.

EW 101-148

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY



Adequate Wiring

PLAYS A PART IN EVERY APPLIANCE SALE

You may not think of it that way, but every time you sell an appliance, it goes out on approval. The manufacturer's name—and yours—only earn it the chance to be tested. In the buyer's home, performance puts the "prove" in approval! In electrical appliances, particularly, "handsome is, *only* as handsome does!"

That's why adequate wiring today is the key to successful appliance selling now and in the future. The home that is wired for full and efficient service is the home of a satisfied customer. Satisfaction is valuable; it means repeat sales . . . and a larger prospect list to help with your selling tomorrow.

PACIFIC COAST ELECTRICAL ASSOCIATION

601 W. Fifth St., Los Angeles 13, Calif. ★ 477 Sutter St., San Francisco 8, Calif.

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